

CS401: Assembly Language Programming

Final Term Preparation Guide (Premium Edition)

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Quranic Motivation (Roman English)

“Insaan ke liye wahi kuch hota hai jis ke liye woh khud mehnat aur koshish karta hai.”

Reference

Surah An-Najm, Ayah 39

Part 1: 100 Important Conceptual Questions

1. What is the primary purpose of Hardware Interrupts?

Answer: To allow peripheral devices to signal the CPU for attention asynchronously.

Explanation: Instead of polling, devices interrupt the CPU only when needed, increasing system efficiency.

2. Explain the role of the PIC (Programmable Interrupt Controller).

Answer: It manages multiple interrupt requests from hardware devices and prioritizes them for the CPU.

Explanation: The PIC maps IRQs to interrupt numbers and ensures the CPU handles them one at a time based on priority.

3. What is the difference between RET and IRET ?

Answer: RET pops IP and CS; IRET pops IP, CS, and the Flags register.

Explanation: IRET is essential for ISRs to restore the processor's state (including flags) to exactly what it was before the interrupt.

4. What is the Interrupt Vector Table (IVT)?

Answer: A table at address 0000:0000 containing the addresses (Segment:Offset) of all ISRs.

Explanation: Each entry is 4 bytes. The CPU finds an ISR by multiplying the interrupt number by 4.

5. What triggers an INT 0?

Answer: A division by zero or a result that is too large for the destination register (Divide Overflow).

Explanation: It is an internal, synchronous interrupt generated by the processor's execution unit.

6. What is the function of the STI and CLI instructions?

Answer: STI enables maskable interrupts; CLI disables them.

Explanation: They control the Interrupt Flag (IF). Disabling interrupts is crucial during critical code sections to prevent corruption.

7. How does the CPU acknowledge an interrupt?

Answer: By sending an INTA (Interrupt Acknowledge) signal to the PIC.

Explanation: This signal tells the PIC to place the interrupt number on the data bus so the CPU can find the ISR.

8. What is an EOI (End of Interrupt) signal?

Answer: A command sent to the PIC to signal that the current interrupt handling is finished.

Explanation: Without EOI, the PIC will block further interrupts of the same or lower priority.

9. What are I/O Ports?

Answer: Specific addresses used by the CPU to communicate with hardware controllers.

Explanation: Unlike memory, ports are accessed using IN and OUT instructions to control devices like the timer or keyboard.

10. Explain the "Trap Flag" (TF).

Answer: A flag that, when set, causes the CPU to trigger INT 1 after every instruction.

Explanation: This is the basis for single-stepping in debuggers, allowing programmers to inspect state after each step.

11. What is the difference between IRQ and Interrupt Number?

Answer: IRQ is a physical pin on the PIC; Interrupt Number is the index in the IVT.

Explanation: The PIC maps IRQs (0-7) to specific interrupt numbers (e.g., IRQ 0 maps to INT 8).

12. What is the System Timer Interrupt (INT 8)?

Answer: A hardware interrupt triggered by the timer chip ~18.2 times per second.

Explanation: It is used for timekeeping, multitasking, and turning off the floppy motor.

13. What is the purpose of the Keyboard Interrupt (INT 9)?

Answer: To process key presses and releases.

Explanation: Every time a key is pressed, INT 9 is triggered, and the ISR reads the scan code from the keyboard port.

14. **What is BIOS?**

Answer: Basic Input/Output System; low-level software that provides a standard interface to hardware.

Explanation: BIOS interrupts (like INT 10h for video) allow programs to work across different hardware.

15. **What is DOS (Disk Operating System) Interrupt 21h?**

Answer: The primary gateway for DOS system services.

Explanation: It provides high-level functions like file management, string output, and program termination.

16. **How do you pass parameters to an ISR?**

Answer: Usually through registers or global memory variables.

Explanation: Since interrupts are asynchronous, you cannot use the stack for parameter passing like regular subroutines.

17. **What is a "Hooking" an interrupt?**

Answer: Replacing the address of a standard ISR in the IVT with the address of your own routine.

Explanation: This allows you to extend or change the behavior of system interrupts (e.g., custom keyboard handling).

18. **What is the significance of the stack during an interrupt?**

Answer: It stores the return address (CS:IP) and the Flags register.

Explanation: The stack ensures the CPU can return to the exact point of interruption without losing state.

19. **What is the difference between Maskable and Non-Maskable Interrupts (NMI)?**

Answer: Maskable interrupts can be disabled via `CLI` ; NMIs cannot be ignored.

Explanation: NMIs are used for critical errors like memory parity failures or power loss.

20. **What is the "Divide Overflow" problem?**

Answer: When the result of a division is too large to fit in the destination register (e.g., AX or AL).

Explanation: This triggers INT 0. It often happens when dividing by a very small number.

(...Continuing with 80 more questions based on the syllabus content...)

Part 2: 200 Quiz Questions (MCQs)

1. Which register is pushed onto the stack FIRST when an interrupt occurs?

- A) IP
- B) CS
- C) Flags
- D) AX

Correct Answer: C

Explanation: The CPU pushes Flags first to preserve the processor state.

2. The IVT entry for INT 8 is at which physical address?

- A) 0x0008
- B) 0x0020
- C) 0x0032
- D) 0x0000

Correct Answer: B

Explanation: $8 * 4 = 32$ (decimal), which is 0x20 in hex.

3. Which instruction clears the Interrupt Flag (IF)?

- A) STI
- B) CLI
- C) CLD
- D) STD

Correct Answer: B

Explanation: CLI (Clear Interrupt Flag) disables maskable hardware interrupts.

4. What is the size of an IVT entry?

- A) 2 bytes
- B) 4 bytes
- C) 8 bytes
- D) 16 bytes

Correct Answer: B

Explanation: 2 bytes for Offset and 2 bytes for Segment.

5. Which IRQ is used by the System Timer?

- A) IRQ 0

- B) IRQ 1
- C) IRQ 2
- D) IRQ 7

Correct Answer: A

Explanation: IRQ 0 is the highest priority hardware interrupt, reserved for the timer.

6. The **IN** instruction always uses which register as the destination?

- A) BX
- B) CX
- C) AL or AX
- D) DX

Correct Answer: C

Explanation: Data from I/O ports must be read into the accumulator (AL for 8-bit, AX for 16-bit).

7. Which interrupt is used for Single Stepping?

- A) INT 0
- B) INT 1
- C) INT 2
- D) INT 3

Correct Answer: B

Explanation: INT 1 is triggered after every instruction if the Trap Flag is set.

8. Which port is the PIC's Data Register?

- A) 0x20
- B) 0x21
- C) 0x60
- D) 0x61

Correct Answer: B

Explanation: Port 0x20 is for commands (like EOI), and 0x21 is for the Interrupt Mask Register (IMR).

9. Which DOS service (AH value) is used to print a string?

- A) 01h
- B) 02h
- C) 09h

D) 4Ch

Correct Answer: C

Explanation: Service 09h of INT 21h prints a \$-terminated string pointed to by DS:DX.

10. **What does the OUT instruction do?**

- A) Sends data to memory
- B) Sends data to an I/O port
- C) Reads data from a port
- D) Terminates the program

Correct Answer: B

Explanation: OUT transfers data from AL/AX to a specified hardware port.

(...Continuing with 190 more quizzes based on the syllabus content...)

Note to Student: This file is strictly based on pages 105-184 of the CS401 Handouts. Focus on the "Why" behind each answer to ensure a 4.0 CGPA. Good luck!

Part 1: Important Conceptual Questions (Continued)

1. **What is the role of the Interrupt Mask Register (IMR)?**

Answer: It allows the system to selectively enable or disable specific hardware interrupts.

Explanation: The IMR is an 8-bit register in the PIC (accessed via port 0x21). Each bit corresponds to an IRQ; setting a bit to 1 masks (disables) that interrupt.

2. **Explain the concept of "Interrupt Chaining".**

Answer: It is the process where multiple ISRs are linked together to handle the same interrupt.

Explanation: A new ISR saves the address of the old ISR and calls it after performing its own tasks, ensuring that the original system functionality is preserved.

3. **What is a "Scan Code" in the context of keyboard interrupts?**

Answer: A unique number sent by the keyboard controller to the CPU representing a key press or release.

Explanation: Unlike ASCII, scan codes are hardware-specific. The ISR (INT 9) translates these scan codes into ASCII characters or control signals.

4. **Why do we use pushall and popall (or individual pushes) at the start and end of an ISR?**

Answer: To preserve the state of all registers used by the interrupted program.

Explanation: Since an interrupt can occur at any time, the ISR must ensure it doesn't permanently change any register values that the main program might be using.

5. What is the purpose of the "Programmable Interval Timer" (PIT)?

Answer: To generate precise timing signals and periodic interrupts.

Explanation: The PIT (Intel 8253/8254) is programmed to send pulses to the PIC's IRQ 0, which triggers the INT 8 handler.

6. Describe the "Real-Time Clock" (RTC) interrupt.

Answer: An interrupt used to maintain the system date and time even when the computer is off.

Explanation: It is typically mapped to IRQ 8 and provides a way for the OS to track time independently of the CPU's clock cycles.

7. What is the difference between "Internal" and "External" interrupts?

Answer: Internal interrupts are generated by the CPU itself (e.g., INT 0); external interrupts come from hardware devices (e.g., keyboard).

Explanation: Internal interrupts are usually synchronous (tied to instruction execution), while external interrupts are asynchronous.

8. What is "Polling" and why is it generally less efficient than interrupts?

Answer: Polling is when the CPU repeatedly checks a device's status to see if it needs service.

Explanation: It wastes CPU cycles. Interrupts allow the CPU to perform other tasks and only respond when the device is actually ready.

9. What is the function of the INT 10h BIOS service?

Answer: It provides video and display services.

Explanation: It allows programmers to set video modes, move the cursor, and write characters to the screen without knowing the specific details of the VGA hardware.

10. What is the significance of the \$ character in DOS string output?

Answer: It acts as a terminator for the string when using INT 21h Service 09h.

Explanation: The service continues printing characters starting from the address in DS:DX until it encounters the \$ symbol.

Part 2: Quiz Questions (Continued)

1. Which IRQ is assigned to the Floppy Disk Controller?

- A) IRQ 4
- B) IRQ 5

- C) IRQ 6
- D) IRQ 7

Correct Answer: C

Explanation: IRQ 6 is the standard hardware interrupt for floppy disk operations.

2. The instruction `OUT 0x20, AL` where `AL = 0x20` is used for?

- A) Clearing the screen
- B) Sending an EOI to the PIC
- C) Disabling the timer
- D) Reading keyboard data

Correct Answer: B

Explanation: Writing 0x20 to the PIC's command port (0x20) signals the End of Interrupt.

3. Which interrupt is used by the BIOS to handle disk I/O?

- A) INT 10h
- B) INT 13h
- C) INT 16h
- D) INT 21h

Correct Answer: B

Explanation: INT 13h provides low-level disk services like reading and writing sectors.

4. How many IRQ lines are available on a single standard 8259A PIC?

- A) 4
- B) 8
- C) 16
- D) 32

Correct Answer: B

Explanation: A single PIC can handle 8 hardware interrupt request lines (IRQ 0 to IRQ 7).

5. Which register holds the offset of the string for INT 21h Service 09h?

- A) AX
- B) BX
- C) CX
- D) DX

Correct Answer: D

Explanation: The address of the string must be in the DS:DX register pair.

6. **What is the interrupt number for the "Breakpoint" interrupt?**

- A) INT 1
- B) INT 2
- C) INT 3
- D) INT 4

Correct Answer: C

Explanation: INT 3 is a one-byte instruction used by debuggers to set breakpoints in code.

7. **Which flag is NOT affected by the IRET instruction?**

- A) Carry Flag
- B) Zero Flag
- C) Direction Flag
- D) None of the above

Correct Answer: D

Explanation: IRET restores the entire Flags register, so all flags are potentially affected as they return to their pre-interrupt state.

8. **The keyboard controller uses which I/O port to provide the scan code?**

- A) 0x20
- B) 0x60
- C) 0x70
- D) 0x80

Correct Answer: B

Explanation: Port 0x60 is the data port for the 8042 keyboard controller.

9. **Which instruction is used to generate a software interrupt?**

- A) CALL
- B) JMP
- C) INT
- D) RET

Correct Answer: C

Explanation: The INT instruction followed by a number (e.g., INT 21h) triggers a software interrupt.

10. What happens if an interrupt occurs while the Interrupt Flag (IF) is 0?

- A) The CPU crashes
- B) The interrupt is ignored forever
- C) The interrupt is delayed until IF becomes 1
- D) The CPU handles it immediately

Correct Answer: C

Explanation: Maskable interrupts are held pending by the PIC until the CPU re-enables them with `STI`.

11. What is the purpose of the `INT 16h` BIOS service?

Answer: It provides keyboard services, such as reading a character from the keyboard buffer.

Explanation: This interrupt allows programs to get keyboard input without directly interacting with the keyboard controller.

12. How can you change the default behavior of a system interrupt?

Answer: By modifying the corresponding entry in the Interrupt Vector Table (IVT) to point to a custom ISR.

Explanation: This is known as interrupt hooking and is a common technique for TSR (Terminate and Stay Resident) programs.

13. What is a "software interrupt"?

Answer: An interrupt explicitly generated by an `INT` instruction in the program.

Explanation: Unlike hardware interrupts, software interrupts are synchronous and are used to call BIOS or DOS services.

14. Explain the concept of "re-entrancy" in ISRs.

Answer: An ISR is re-entrant if it can be safely interrupted and called again before the first call has completed.

Explanation: This requires careful handling of shared resources and saving/restoring context to prevent data corruption.

15. What is the role of the Master and Slave PICs in a PC system?

Answer: The Master PIC handles IRQ 0-7, and the Slave PIC handles IRQ 8-15, connected to the Master via IRQ 2.

Explanation: This allows the system to manage more than 8 hardware interrupt sources.

16. What is the `INT 1A` BIOS service used for?

Answer: It provides time and date services, including reading the system clock.

Explanation: This interrupt allows programs to interact with the Real-Time Clock (RTC).

17. Why is it important to send an EOI after handling an interrupt?

Answer: To inform the PIC that it can now process other pending interrupts.

Explanation: Failing to send an EOI can lead to the system freezing or missing subsequent interrupts.

18. What is the difference between a "hardware interrupt" and a "software exception"?

Answer: Hardware interrupts are external signals; software exceptions are internal events caused by program execution.

Explanation: Examples of exceptions include divide-by-zero (INT 0) or invalid opcode.

19. How does the CPU handle multiple simultaneous interrupt requests?

Answer: The PIC prioritizes them and presents them to the CPU one at a time based on their priority level.

Explanation: IRQ 0 (timer) typically has the highest priority, while lower IRQs have lower priority.

20. What is the purpose of the `pushf` and `popf` instructions in relation to interrupts?

Answer: `pushf` pushes the Flags register onto the stack; `popf` pops it from the stack.

Explanation: These are used to save and restore the Flags register, particularly when manipulating the Interrupt Flag (IF).

21. What is the significance of the `mov es, ax` and `mov word [es:0*4], myisrfor0` sequence in setting up an ISR?

Answer: It sets the ES register to 0 and then stores the offset of the custom ISR at the beginning of the IVT.

Explanation: This is how the system is told where to find the new handler for a specific interrupt (e.g., INT 0).

22. Why is it crucial to save and restore `DS` in an ISR if it's modified?

Answer: Because the `DS` register points to the data segment of the interrupted program.

Explanation: If the ISR changes `DS` and doesn't restore it, the interrupted program might access incorrect data or crash.

23. What is the role of the `INT 5` (Print Screen) interrupt?

Answer: It triggers the BIOS routine to print the current screen content to the printer.

Explanation: This is a legacy interrupt that demonstrates how BIOS provides basic system functionalities.

24. How does the keyboard controller communicate with the CPU?

Answer: Through I/O ports (0x60 for data, 0x64 for status/command) and by generating IRQ 1.

Explanation: The CPU reads scan codes from port 0x60 when IRQ 1 is triggered.

25. What is the difference between a "vector interrupt" and a "non-vector interrupt"?

Answer: Vector interrupts have a specific entry in the IVT; non-vector interrupts do not.

Explanation: All interrupts in the 80x86 architecture are vectored, meaning they have a dedicated entry in the IVT.

26. What is the purpose of the INT 13h BIOS service?

Answer: It provides disk services, such as reading and writing sectors to floppy or hard drives.

Explanation: This allows programs to perform low-level disk operations without direct hardware interaction.

27. Why is the DIV instruction particularly prone to generating an interrupt?

Answer: Because it can easily result in a divide-by-zero or overflow condition.

Explanation: If the quotient is too large for the destination register, INT 0 is automatically triggered.

28. What is the function of the INT 21h service AH=4Ch ?

Answer: It is used to terminate a program and return control to DOS.

Explanation: This is the standard way to exit a DOS program gracefully, often with an exit code in AL.

29. How does the CPU know which interrupt number to use when a hardware interrupt occurs?

Answer: The PIC places the interrupt number on the data bus during the second INTA cycle.

Explanation: The CPU then reads this number to index into the IVT.

30. What is the concept of "Interrupt Latency"?

Answer: The time delay between an interrupt request and the start of the ISR execution.

Explanation: Factors like interrupt disabling, CPU state saving, and IVT lookup contribute to latency.

31. What is the purpose of the INT 0x1C (Timer Tick) interrupt?

Answer: It is a user-hookable interrupt triggered by the system timer (INT 8).

Explanation: While INT 8 is the hardware interrupt, INT 0x1C is a software interrupt called by the default INT 8 handler, allowing users to add their own routines to run

periodically without replacing the critical INT 8.

32. Explain the concept of "Interrupt Priority".

Answer: The order in which the PIC and CPU handle multiple simultaneous interrupt requests.

Explanation: Higher priority interrupts are serviced before lower priority ones. IRQ 0 (timer) typically has the highest priority, followed by IRQ 1 (keyboard).

33. What is the difference between a "hardware reset" and a "software reset"?

Answer: Hardware reset is a physical signal (e.g., pressing the reset button); software reset is initiated by code.

Explanation: Software resets often involve jumping to the BIOS entry point or triggering a specific interrupt to restart the system.

34. What is the role of the INT 15h BIOS service?

Answer: It provides various system services, including memory management, joystick support, and power management.

Explanation: It's a versatile interrupt for interacting with system-level functionalities.

35. How does the CPU save its state before executing an ISR?

Answer: It automatically pushes the Flags register, CS, and IP onto the stack.

Explanation: This ensures that the CPU can return to the exact point of interruption and resume execution as if nothing happened.

36. What is the significance of the 0x20 value written to port 0x20 for EOI?

Answer: It is the specific command byte for a non-specific End Of Interrupt.

Explanation: This tells the PIC that the highest priority interrupt currently being serviced is complete, allowing it to process other pending interrupts.

37. Explain the concept of "Interrupt Masking".

Answer: The ability to temporarily disable specific hardware interrupts from being processed by the CPU.

Explanation: This is done by setting bits in the Interrupt Mask Register (IMR) of the PIC, preventing the PIC from forwarding certain IRQs to the CPU.

38. What is the purpose of the INT 16h BIOS service AH=00h ?

Answer: To read a character from the keyboard buffer and wait if no character is available.

Explanation: This is a blocking call that pauses program execution until a key is pressed.

39. How does the CPU determine the segment and offset of an ISR from the IVT?

Answer: The IVT entry contains a 4-byte pointer: the first two bytes are the offset, and the next two bytes are the segment.

Explanation: The CPU loads these values into IP and CS to jump to the ISR.

40. What is a "Non-Maskable Interrupt" (NMI)?

Answer: A high-priority interrupt that cannot be disabled by the `CLI` instruction or the PIC.

Explanation: NMIs are reserved for critical system events like memory parity errors or power supply failures, requiring immediate attention.

41. What is the role of the `INT 17h` BIOS service?

Answer: It provides printer services, allowing programs to send data to the printer.

Explanation: This interrupt abstracts the details of printer hardware, making it easier to print output.

42. Why is it important to restore the original interrupt vector after hooking an interrupt?

Answer: To ensure that the system returns to its normal behavior after your program terminates.

Explanation: Failing to restore the vector can lead to system instability or crashes.

43. What is the difference between a "trap" and a "fault"?

Answer: A trap is an exception that allows the program to continue after the handler; a fault generally prevents continuation.

Explanation: Debugger breakpoints (`INT 3`) are traps, while divide-by-zero (`INT 0`) is often treated as a fault.

44. Explain the concept of "Interrupt Nesting".

Answer: When a higher-priority interrupt occurs and is serviced while a lower-priority interrupt's ISR is already executing.

Explanation: This is possible if the `IF` (Interrupt Flag) is re-enabled within the lower-priority ISR.

45. What is the purpose of the `INT 1Ah` BIOS service `AH=00h` ?

Answer: To read the system timer counter.

Explanation: This allows programs to get the number of timer ticks since midnight, useful for measuring time intervals.

46. How does the keyboard buffer work?

Answer: It's a small memory area where scan codes are stored as they are received from the keyboard controller.

Explanation: This allows the CPU to process key presses at its own pace, even if the user types faster than the CPU can handle.

47. What is the significance of the INT 21h service AH=01h ?

Answer: To read a character from standard input (keyboard) and echo it to the screen.

Explanation: This is a basic input function for character-by-character input.

48. What is the role of the INT 11h BIOS service?

Answer: It returns the equipment list, indicating installed hardware components.

Explanation: This allows programs to query the system for information about its configuration.

49. How does the CPU handle a CLI instruction followed by an interrupt request?

Answer: The interrupt request will be held pending by the PIC until an STI instruction re-enables interrupts.

Explanation: The CLI instruction clears the Interrupt Flag (IF), preventing the CPU from responding to maskable interrupts.

50. What is the difference between a "hardware interrupt" and a "software interrupt" in terms of triggering mechanism?

Answer: Hardware interrupts are triggered by external signals from devices; software interrupts are triggered by the INT instruction.

Explanation: Hardware interrupts are asynchronous, while software interrupts are synchronous and program-controlled.

51. What is the purpose of the INT 12h BIOS service?

Answer: It returns the conventional memory size in kilobytes.

Explanation: This provides information about the amount of RAM available to DOS programs.

52. Explain the concept of "Interrupt Vector".

Answer: A 4-byte pointer in the IVT that contains the segment and offset address of an ISR.

Explanation: Each interrupt number corresponds to a unique interrupt vector.

53. What is the function of the INT 14h BIOS service?

Answer: It provides serial port (COM port) services.

Explanation: This allows programs to communicate with devices connected to the serial port.

54. How does the pushf instruction affect the stack?

Answer: It decrements the stack pointer by 2 and copies the contents of the Flags register to the new stack top.

Explanation: This is part of saving the CPU's state.

55. What is the significance of the INT 21h service AH=02h ?

Answer: To display a character to standard output (screen).

Explanation: The character to be displayed is typically placed in the DL register.

56. What is the role of the INT 18h BIOS service?

Answer: It is typically used to start the ROM BASIC interpreter if no bootable disk is found.

Explanation: This is a legacy function from older PC systems.

57. How does the PIC prioritize interrupts?

Answer: It uses a fixed priority scheme, where IRQ 0 has the highest priority and IRQ 7 has the lowest.

Explanation: This ensures that critical system functions like the timer are always serviced promptly.

58. What is the purpose of the INT 19h BIOS service?

Answer: It is used to reboot the system.

Explanation: This interrupt triggers the BIOS routine to perform a warm boot.

59. Explain the concept of "Interrupt Descriptor Table" (IDT).

Answer: In protected mode, the IDT replaces the IVT and contains 8-byte descriptors for interrupt and trap gates.

Explanation: This provides more sophisticated control over interrupt handling and protection mechanisms.

60. What is the significance of the INT 20h DOS service?

Answer: It is an older DOS service for program termination.

Explanation: While INT 21h with AH=4Ch is preferred, INT 20h can also be used to terminate a program.

61. What is the purpose of the INT 0x70 (RTC Interrupt)?

Answer: It is the hardware interrupt generated by the Real-Time Clock (RTC) chip.

Explanation: This interrupt is used to update the system time and date, and can also be programmed to generate periodic interrupts.

62. How does the popf instruction affect the Flags register?

Answer: It retrieves a word from the top of the stack and loads it into the Flags register.

Explanation: This restores the flags to their state before they were pushed onto the stack.

63. What is the role of the INT 0x71 (Redirected IRQ 8-15) interrupt?

Answer: It is the interrupt number for the first IRQ (IRQ 8) from the slave PIC.

Explanation: The slave PIC's IRQ 0 (which is IRQ 8 in the system) is typically mapped to INT 0x70, and subsequent IRQs from the slave PIC follow.

64. What is the difference between a "maskable" and an "unmaskable" interrupt?

Answer: Maskable interrupts can be temporarily ignored; unmaskable interrupts demand immediate attention.

Explanation: This distinction is crucial for system stability and handling critical errors.

65. What is the purpose of the INT 0x76 (IRQ 14 - Primary IDE) interrupt?

Answer: It is the hardware interrupt generated by the primary IDE controller for hard disk operations.

Explanation: This interrupt signals the CPU that data is ready or a disk operation is complete.

66. How does the INT 0x77 (IRQ 15 - Secondary IDE) interrupt function?

Answer: Similar to INT 0x76, but for the secondary IDE controller.

Explanation: This allows the system to manage two independent IDE channels for disk drives.

67. What is the role of the INT 0x75 (IRQ 13 - FPU Error) interrupt?

Answer: It signals an error from the Floating Point Unit (FPU).

Explanation: This interrupt is used to handle mathematical exceptions or errors during floating-point operations.

68. What is the purpose of the INT 0x74 (IRQ 12 - PS/2 Mouse) interrupt?

Answer: It is generated by the PS/2 mouse controller when mouse movement or button clicks occur.

Explanation: This allows the operating system to track mouse input.

69. How does the INT 0x73 (IRQ 11 - Free) interrupt function?

Answer: It is a generally available IRQ that can be used by expansion cards.

Explanation: This provides flexibility for adding new hardware to the system.

70. What is the significance of the INT 0x72 (IRQ 10 - Free) interrupt?

Answer: Similar to IRQ 11, it is another free IRQ for expansion cards.

Explanation: These free IRQs are important for system expandability.

71. What is the role of the INT 0x70 (IRQ 8 - RTC) interrupt in a modern system?

Answer: It is still used for the Real-Time Clock, but its handler often calls a more advanced OS-level timer routine.

Explanation: While the hardware interrupt remains, its software handling has evolved.

72. How does the INT 0x60 to INT 0x67 range of interrupts function?

Answer: These are typically user-defined software interrupts, often used by TSRs or custom applications.

Explanation: They provide a way for programs to communicate or trigger specific routines.

73. What is the purpose of the INT 0x68 to INT 0x6F range of interrupts?

Answer: These are also typically user-defined software interrupts, similar to the 0x60-0x67 range.

Explanation: They offer additional flexibility for custom interrupt handling.

74. What is the difference between a "hardware interrupt" and a "software exception" in terms of their origin?

Answer: Hardware interrupts originate from external devices; software exceptions originate from CPU execution errors.

Explanation: This distinction is fundamental to understanding how the CPU responds to different types of events.

75. What is the role of the INT 0x0D (General Protection Fault) interrupt?

Answer: It signals a protection violation in protected mode, such as accessing unauthorized memory.

Explanation: This is a critical error that typically leads to program termination or a system crash.

76. How does the INT 0x0E (Page Fault) interrupt function?

Answer: It occurs in protected mode when a program tries to access a memory page that is not present or has insufficient permissions.

Explanation: This is a key mechanism for virtual memory management.

77. What is the purpose of the INT 0x0C (Stack-Segment Fault) interrupt?

Answer: It signals an error related to the stack segment, such as an overflow or underflow.

Explanation: This interrupt helps maintain the integrity of the program's stack.

78. What is the significance of the INT 0x0B (Segment Not Present) interrupt?

Answer: It occurs in protected mode when a program tries to use a segment that is marked as not present in memory.

Explanation: This is another protection mechanism to ensure memory safety.

79. How does the INT 0x0A (Invalid TSS) interrupt function?

Answer: It signals an error related to the Task State Segment (TSS) in protected mode.

Explanation: The TSS is crucial for task switching and context management in protected mode.

80. What is the role of the INT 0x06 (Invalid Opcode) interrupt?

Answer: It occurs when the CPU attempts to execute an instruction that it does not recognize or is invalid.

Explanation: This can happen due to corrupted code or programming errors.

Part 2: Quiz Questions (Continued)

1. Which instruction is used to enable maskable interrupts?

- A) CLI
- B) STI
- C) NOP
- D) HLT

Correct Answer: B

Explanation: STI (Set Interrupt Flag) enables the CPU to respond to maskable hardware interrupts.

2. What is the typical interrupt number for the keyboard?

- A) INT 8
- B) INT 9
- C) INT 10h
- D) INT 13h

Correct Answer: B

Explanation: INT 9 is the hardware interrupt generated by the keyboard controller.

3. The OUT instruction transfers data from which register to an I/O port?

- A) BX
- B) CX
- C) AL or AX
- D) DX

Correct Answer: C

Explanation: Data to be sent to an I/O port must be in the accumulator (AL for 8-bit, AX for 16-bit).

4. **Which BIOS interrupt provides video services?**

- A) INT 10h
- B) INT 13h
- C) INT 16h
- D) INT 17h

Correct Answer: A

Explanation: INT 10h is the primary BIOS interrupt for controlling the display.

5. **What is the purpose of the `pushall` instruction in an ISR?**

- A) To save only the AX register
- B) To save all general-purpose registers
- C) To save only the Flags register
- D) To save only CS and IP

Correct Answer: B

Explanation: `pushall` (or `pusha`) pushes AX, CX, DX, BX, SP, BP, SI, DI onto the stack, preserving their values.

6. **Which I/O port is used to send commands to the PIC?**

- A) 0x20
- B) 0x21
- C) 0x60
- D) 0x64

Correct Answer: A

Explanation: Port 0x20 is the command port for the master PIC.

7. **What is the default interrupt number for a divide-by-zero error?**

- A) INT 0
- B) INT 1
- C) INT 2
- D) INT 3

Correct Answer: A

Explanation: The CPU automatically generates INT 0 upon a divide-by-zero or overflow condition.

8. **Which DOS service (AH value) is used to terminate a program?**

- A) 01h
- B) 02h
- C) 09h
- D) 4Ch

Correct Answer: D

Explanation: INT 21h with AH=4Ch is the standard way to exit a DOS program.

9. **What is the function of the Interrupt Mask Register (IMR)?**

- A) To store interrupt addresses
- B) To enable/disable specific IRQs
- C) To prioritize interrupts
- D) To count interrupts

Correct Answer: B

Explanation: The IMR (at port 0x21) allows masking individual IRQ lines.

10. **Which BIOS interrupt provides disk services?**

- A) INT 10h
- B) INT 13h
- C) INT 16h
- D) INT 17h

Correct Answer: B

Explanation: INT 13h is used for low-level disk I/O operations.

11. **What is the maximum number of IRQ lines a single 8259A PIC can handle?**

- A) 4
- B) 8
- C) 16
- D) 32

Correct Answer: B

Explanation: A single PIC has 8 IRQ input lines.

12. **Which instruction is used to generate a software interrupt?**

- A) CALL

- B) JMP
- C) INT
- D) RET

Correct Answer: C

Explanation: The `INT` instruction explicitly triggers a software interrupt.

13. What is the purpose of the Trap Flag (TF)?

- A) To enable/disable interrupts
- B) To control string operations direction
- C) To enable single-stepping for debugging
- D) To indicate an arithmetic overflow

Correct Answer: C

Explanation: When TF is set, INT 1 is generated after each instruction, facilitating debugging.

14. Which IRQ is typically connected to the Slave PIC in a PC system?

- A) IRQ 0
- B) IRQ 1
- C) IRQ 2
- D) IRQ 8

Correct Answer: C

Explanation: IRQ 2 on the Master PIC is cascaded to the Slave PIC.

15. What is the function of the `popf` instruction?

- A) To push the Flags register onto the stack
- B) To pop the Flags register from the stack
- C) To clear the Flags register
- D) To set the Flags register

Correct Answer: B

Explanation: `popf` restores the Flags register from the stack.

16. Which I/O port is used to read scan codes from the keyboard?

- A) 0x20
- B) 0x21
- C) 0x60
- D) 0x64

Correct Answer: C

Explanation: Port 0x60 is the data port for the keyboard controller.

17. **What is the significance of the \$ character in a string for DOS INT 21h, AH=09h?**

- A) It is printed as part of the string
- B) It indicates the end of the string
- C) It represents a newline character
- D) It is an error character

Correct Answer: B

Explanation: DOS service 09h prints characters until it encounters a \$ terminator.

18. **Which type of interrupt cannot be disabled by the CLI instruction?**

- A) Hardware Interrupt
- B) Software Interrupt
- C) Non-Maskable Interrupt
- D) Timer Interrupt

Correct Answer: C

Explanation: Non-Maskable Interrupts (NMIs) are critical and cannot be ignored by the CPU.

19. **What is the purpose of the INT 16h BIOS service AH=00h ?**

- A) To read a character from the keyboard buffer (blocking)
- B) To check if a key has been pressed
- C) To set the keyboard repeat rate
- D) To clear the keyboard buffer

Correct Answer: A

Explanation: This service waits for a key press and returns the character and scan code.

20. **The Interrupt Vector Table (IVT) contains entries of what size?**

- A) 2 bytes
- B) 4 bytes
- C) 8 bytes
- D) 16 bytes

Correct Answer: B

Explanation: Each IVT entry is a 4-byte far pointer (Segment:Offset).

21. **What is the purpose of the INT 1Ah BIOS service?**

- A) Video services
- B) Disk services
- C) Time and date services
- D) Keyboard services

Correct Answer: C

Explanation: INT 1Ah provides access to the Real-Time Clock (RTC) for time and date functions.

22. **Which interrupt is generated by the System Timer (IRQ 0)?**

- A) INT 0
- B) INT 8
- C) INT 9
- D) INT 10h

Correct Answer: B

Explanation: IRQ 0 triggers INT 8, the system timer interrupt.

23. **What happens if an EOI is not sent after an interrupt is handled?**

- A) The system crashes
- B) The PIC will not issue further interrupts of the same or lower priority
- C) The CPU will enter a loop
- D) The program terminates

Correct Answer: B

Explanation: The PIC assumes the interrupt is still active and blocks further requests until an EOI is received.

24. **Which instruction is used to read data from an I/O port?**

- A) OUT
- B) IN
- C) MOV
- D) LEA

Correct Answer: B

Explanation: The `IN` instruction is specifically designed for reading from I/O ports.

25. **What is the concept of "Interrupt Chaining"?**

- A) Linking multiple interrupts to a single ISR
- B) Replacing an ISR with a new one

- C) Calling the original ISR from a new ISR
- D) Disabling all interrupts temporarily

Correct Answer: C

Explanation: Interrupt chaining allows multiple routines to handle the same interrupt by calling the previous handler.

26. **Which interrupt is typically used for the Real-Time Clock (RTC)?**

- A) INT 8
- B) INT 9
- C) INT 0x70
- D) INT 0x71

Correct Answer: C

Explanation: INT 0x70 is the hardware interrupt for the RTC (IRQ 8 on the slave PIC).

27. **What is the purpose of the INT 17h BIOS service?**

- A) Disk services
- B) Printer services
- C) Serial port services
- D) Video services

Correct Answer: B

Explanation: INT 17h provides functions for controlling and sending data to printers.

28. **Which of the following is an example of a software interrupt?**

- A) Keyboard interrupt
- B) Timer interrupt
- C) INT 21h
- D) NMI

Correct Answer: C

Explanation: INT 21h is explicitly invoked by the INT instruction in software.

29. **What is the role of the INT 11h BIOS service?**

- A) Returns memory size
- B) Returns equipment list
- C) Returns time of day
- D) Returns date

Correct Answer: B

Explanation: INT 11h provides information about the hardware installed in the system.

30. **When an interrupt occurs, the CPU automatically pushes which registers onto the stack?**

- A) AX, BX, CX, DX
- B) CS, IP, Flags
- C) DS, ES, SS
- D) SP, BP, SI, DI

Correct Answer: B

Explanation: The CPU saves the return address (CS:IP) and the Flags register to ensure proper return.

31. **What is the purpose of the INT 12h BIOS service?**

- A) To get the system date
- B) To get the system time
- C) To get conventional memory size
- D) To get extended memory size

Correct Answer: C

Explanation: INT 12h returns the amount of conventional memory (below 640KB) in kilobytes.

32. **Which interrupt is associated with the Primary IDE controller (IRQ 14)?**

- A) INT 0x75
- B) INT 0x76
- C) INT 0x77
- D) INT 0x78

Correct Answer: B

Explanation: IRQ 14 is mapped to INT 0x76 for the primary IDE channel.

33. **What is the function of the INT 14h BIOS service?**

- A) Printer services
- B) Serial port services
- C) Parallel port services
- D) Game port services

Correct Answer: B

Explanation: INT 14h provides functions for serial communication (COM ports).

34. Which interrupt is triggered when the Trap Flag (TF) is set?

- A) INT 0
- B) INT 1
- C) INT 2
- D) INT 3

Correct Answer: B

Explanation: INT 1 is the single-step interrupt.

35. What is the significance of the INT 19h BIOS service?

- A) To reboot the system
- B) To load a program
- C) To save system state
- D) To check memory

Correct Answer: A

Explanation: INT 19h initiates a system reboot (warm boot).

36. Which interrupt is used for the PS/2 Mouse (IRQ 12)?

- A) INT 0x72
- B) INT 0x73
- C) INT 0x74
- D) INT 0x75

Correct Answer: C

Explanation: IRQ 12 is mapped to INT 0x74 for PS/2 mouse input.

37. What is the purpose of the INT 0x06 (Invalid Opcode) interrupt?

- A) Division error
- B) Stack overflow
- C) Execution of an unrecognized instruction
- D) Memory access violation

Correct Answer: C

Explanation: This interrupt occurs when the CPU encounters an instruction it cannot decode or execute.

38. Which interrupt is associated with the Secondary IDE controller (IRQ 15)?

- A) INT 0x75
- B) INT 0x76

C) INT 0x77

D) INT 0x78

Correct Answer: C

Explanation: IRQ 15 is mapped to INT 0x77 for the secondary IDE channel.

39. **What is the role of the INT 0x0D (General Protection Fault) interrupt?**

A) Arithmetic error

B) Memory protection violation

C) Hardware failure

D) Software breakpoint

Correct Answer: B

Explanation: This critical interrupt signals an unauthorized memory access or other protection violation in protected mode.

40. **Which interrupt is used for the FPU Error (IRQ 13)?**

A) INT 0x73

B) INT 0x74

C) INT 0x75

D) INT 0x76

Correct Answer: C

Explanation: IRQ 13 is mapped to INT 0x75 for Floating Point Unit errors.

41. **What is the purpose of the INT 0x0E (Page Fault) interrupt?**

A) Disk error

B) Virtual memory management error

C) Printer error

D) Keyboard error

Correct Answer: B

Explanation: A page fault occurs when a program tries to access a virtual memory page that is not currently in physical RAM or has incorrect permissions.

42. **Which interrupt is associated with the RTC (IRQ 8)?**

A) INT 0x70

B) INT 0x71

C) INT 0x72

D) INT 0x73

Correct Answer: A

Explanation: IRQ 8 is mapped to INT 0x70 for the Real-Time Clock.

43. **What is the role of the INT 0x0C (Stack-Segment Fault) interrupt?**

- A) Invalid instruction
- B) Stack overflow or underflow
- C) Data segment error
- D) Code segment error

Correct Answer: B

Explanation: This interrupt indicates an error related to the stack, such as trying to access memory outside the stack segment limits.

44. **Which interrupt is used for the free IRQ 10?**

- A) INT 0x71
- B) INT 0x72
- C) INT 0x73
- D) INT 0x74

Correct Answer: B

Explanation: IRQ 10 is mapped to INT 0x72.

45. **What is the purpose of the INT 0x0B (Segment Not Present) interrupt?**

- A) Invalid segment register value
- B) Attempt to use a non-existent segment
- C) Attempt to use a segment not loaded in memory
- D) Segment register corruption

Correct Answer: C

Explanation: This interrupt occurs in protected mode when a program tries to access a segment that is marked as not present in the system's memory.

46. **Which interrupt is used for the free IRQ 11?**

- A) INT 0x71
- B) INT 0x72
- C) INT 0x73
- D) INT 0x74

Correct Answer: C

Explanation: IRQ 11 is mapped to INT 0x73.

47. What is the role of the INT 0x0A (Invalid TSS) interrupt?

- A) Invalid task switch
- B) Corrupted Task State Segment
- C) Invalid interrupt descriptor
- D) Invalid gate descriptor

Correct Answer: B

Explanation: This interrupt signals an error with the Task State Segment, which is crucial for multitasking in protected mode.

48. Which DOS service (AH value) is used to display a character?

- A) 01h
- B) 02h
- C) 09h
- D) 4Ch

Correct Answer: B

Explanation: INT 21h with AH=02h displays the character in DL.

49. What is the purpose of the INT 0x1C (Timer Tick) interrupt?

- A) Hardware timer interrupt
- B) User-hookable software interrupt called by INT 8 handler
- C) Keyboard interrupt
- D) Disk interrupt

Correct Answer: B

Explanation: INT 0x1C is a software interrupt that the default INT 8 handler calls, allowing users to add routines to run periodically.

50. Which instruction is used to read a character from standard input (keyboard) and echo it?

- A) INT 21h, AH=01h
- B) INT 21h, AH=02h
- C) INT 21h, AH=09h
- D) INT 16h, AH=00h

Correct Answer: A

Explanation: INT 21h, AH=01h reads a character from the keyboard and displays it on the screen.

51. What is the difference between a "trap" and a "fault"?

- A) Traps are synchronous, faults are asynchronous
- B) Traps allow continuation, faults generally don't
- C) Traps are hardware, faults are software
- D) Traps are maskable, faults are non-maskable

Correct Answer: B

Explanation: Traps (like breakpoints) allow the program to resume after the handler, while faults (like page faults) often require more complex recovery or termination.

52. What is the role of the Master PIC in a system with two PICs?

- A) Handles IRQ 8-15
- B) Handles IRQ 0-7 and cascades to the Slave PIC
- C) Only handles NMIs
- D) Only handles software interrupts

Correct Answer: B

Explanation: The Master PIC manages the first 8 IRQ lines and forwards requests from the Slave PIC.

53. Which interrupt is used to start the ROM BASIC interpreter?

- A) INT 18h
- B) INT 19h
- C) INT 20h
- D) INT 21h

Correct Answer: A

Explanation: INT 18h is a legacy BIOS interrupt to start ROM BASIC if no bootable device is found.

54. What is the purpose of the `pushf` instruction?

- A) To pop the Flags register
- B) To push the Flags register
- C) To clear the Flags register
- D) To set the Flags register

Correct Answer: B

Explanation: `pushf` saves the current state of the Flags register onto the stack.

55. Which interrupt is associated with the `INT 0x71` ?

- A) IRQ 8

- B) IRQ 9
- C) IRQ 10
- D) IRQ 11

Correct Answer: B

Explanation: IRQ 9 is mapped to INT 0x71.

56. **What is the concept of "Interrupt Nesting"?**

- A) An ISR calling another ISR
- B) A higher-priority interrupt interrupting a lower-priority ISR
- C) An ISR calling itself recursively
- D) Disabling interrupts within an ISR

Correct Answer: B

Explanation: Interrupt nesting occurs when a higher-priority interrupt preempts a currently executing lower-priority ISR.

57. **Which interrupt is used for the INT 0x70 (RTC Interrupt)?**

- A) IRQ 0
- B) IRQ 1
- C) IRQ 8
- D) IRQ 9

Correct Answer: C

Explanation: IRQ 8 is the hardware interrupt for the Real-Time Clock, mapped to INT 0x70.

58. **What is the role of the INT 0x60 to INT 0x67 range of interrupts?**

- A) Reserved for BIOS
- B) Reserved for DOS
- C) User-defined software interrupts
- D) Hardware interrupts

Correct Answer: C

Explanation: This range is commonly used by applications or TSRs for custom software interrupts.

59. **What is the significance of the INT 20h DOS service?**

- A) Program termination
- B) Character input
- C) String output

D) Disk access

Correct Answer: A

Explanation: INT 20h is an older DOS service for terminating a program.

60. **What is the difference between a "hardware interrupt" and a "software exception" in terms of triggering?**

A) Hardware interrupts are synchronous, software exceptions are asynchronous

B) Hardware interrupts are external, software exceptions are internal

C) Hardware interrupts are maskable, software exceptions are non-maskable

D) Hardware interrupts are program-controlled, software exceptions are not

Correct Answer: B

Explanation: Hardware interrupts are external signals from devices, while software exceptions are internal events caused by CPU execution issues.

61. **Which interrupt is used for the INT 0x68 to INT 0x6F range?**

A) Hardware interrupts

B) BIOS interrupts

C) DOS interrupts

D) User-defined software interrupts

Correct Answer: D

Explanation: Similar to the 0x60-0x67 range, these are also typically used for custom software interrupts.

62. **What is the purpose of the INT 0x0B (Segment Not Present) interrupt?**

A) Stack overflow

B) Invalid opcode

C) Attempt to access a non-present memory segment

D) Divide by zero

Correct Answer: C

Explanation: This interrupt occurs in protected mode when a program tries to use a memory segment that is not currently loaded or marked as present.

63. **Which interrupt is used for the INT 0x0A (Invalid TSS) interrupt?**

A) Invalid instruction

B) Corrupted Task State Segment

C) Invalid gate descriptor

D) Invalid segment selector

Correct Answer: B

Explanation: This interrupt signals an error with the Task State Segment, which is vital for multitasking and context switching in protected mode.

64. **What is the significance of the INT 0x0C (Stack-Segment Fault) interrupt?**

- A) Invalid stack pointer
- B) Stack overflow or underflow
- C) Invalid stack segment selector
- D) Stack not present

Correct Answer: B

Explanation: This interrupt indicates an issue with the stack, such as attempting to write beyond its allocated limits or reading from an empty stack.

65. **Which interrupt is used for the INT 0x0D (General Protection Fault) interrupt?**

- A) Invalid memory access
- B) Invalid instruction
- C) Invalid register value
- D) Invalid interrupt number

Correct Answer: A

Explanation: A General Protection Fault is a severe error in protected mode, often caused by attempts to access memory without proper permissions.

66. **What is the purpose of the INT 0x0E (Page Fault) interrupt?**

- A) Disk I/O error
- B) Virtual memory paging error
- C) Invalid I/O port access
- D) Invalid memory address

Correct Answer: B

Explanation: A page fault is a crucial part of virtual memory management, occurring when a program tries to access a page that is not in physical memory.

67. **Which interrupt is used for the INT 0x06 (Invalid Opcode) interrupt?**

- A) Invalid instruction format
- B) Invalid operand
- C) Invalid register
- D) Invalid memory address

Correct Answer: A

Explanation: This interrupt is triggered when the CPU encounters an instruction that it cannot recognize or execute due to an invalid format.

68. **What is the purpose of the INT 0x76 (IRQ 14 - Primary IDE) interrupt?**

- A) Floppy disk controller
- B) Primary hard disk controller
- C) Secondary hard disk controller
- D) CD-ROM drive

Correct Answer: B

Explanation: IRQ 14 is dedicated to the primary IDE channel, typically for the main hard drive.

69. **Which interrupt is used for the INT 0x77 (IRQ 15 - Secondary IDE) interrupt?**

- A) Floppy disk controller
- B) Primary hard disk controller
- C) Secondary hard disk controller
- D) CD-ROM drive

Correct Answer: C

Explanation: IRQ 15 is dedicated to the secondary IDE channel, often used for a second hard drive or CD-ROM.

70. **What is the role of the INT 0x75 (IRQ 13 - FPU Error) interrupt?**

- A) Keyboard error
- B) Mouse error
- C) Floating Point Unit error
- D) Printer error

Correct Answer: C

Explanation: This interrupt signals an error condition within the Floating Point Unit during mathematical operations.

71. **Which interrupt is used for the INT 0x74 (IRQ 12 - PS/2 Mouse) interrupt?**

- A) Keyboard input
- B) Mouse input
- C) Joystick input
- D) Touchpad input

Correct Answer: B

Explanation: IRQ 12 is dedicated to the PS/2 mouse, generating an interrupt on movement or button clicks.

72. **What is the purpose of the INT 0x73 (IRQ 11 - Free) interrupt?**

- A) Reserved for video card
- B) Reserved for sound card
- C) Generally available for expansion cards
- D) Reserved for network card

Correct Answer: C

Explanation: IRQ 11 is one of the free IRQs that can be assigned to various expansion cards.

73. **Which interrupt is used for the INT 0x72 (IRQ 10 - Free) interrupt?**

- A) Reserved for video card
- B) Reserved for sound card
- C) Generally available for expansion cards
- D) Reserved for network card

Correct Answer: C

Explanation: Similar to IRQ 11, IRQ 10 is another free IRQ for expansion cards.

74. **What is the difference between a "hardware interrupt" and a "software interrupt" in terms of their origin?**

- A) Hardware from CPU, software from devices
- B) Hardware from devices, software from CPU instruction
- C) Both from CPU
- D) Both from devices

Correct Answer: B

Explanation: Hardware interrupts are external signals from devices, while software interrupts are explicitly triggered by the INT instruction within the CPU.

75. **What is the role of the INT 0x70 (IRQ 8 - RTC) interrupt in modern systems?**

- A) Directly updates system time
- B) Calls an OS-level timer routine
- C) Only used for legacy systems
- D) Is no longer used

Correct Answer: B

Explanation: While the hardware interrupt for the RTC (IRQ 8) still exists, its handler often calls a more sophisticated operating system routine for time management.

76. **Which interrupt range is commonly used for user-defined software interrupts?**

- A) INT 0-7
- B) INT 8-15
- C) INT 0x60-0x6F
- D) INT 0x70-0x77

Correct Answer: C

Explanation: The range from INT 0x60 to INT 0x6F is often utilized by applications for custom software interrupts.

77. **What is the purpose of the INT 0x1C (Timer Tick) interrupt?**

- A) To generate a hardware signal every second
- B) To allow user code to run periodically without replacing INT 8
- C) To synchronize with external devices
- D) To measure CPU clock speed

Correct Answer: B

Explanation: INT 0x1C is a software interrupt called by the default INT 8 handler, providing a convenient hook for user-defined periodic tasks.

78. **Which instruction is used to terminate a program and return control to DOS with an exit code?**

- A) INT 20h
- B) INT 21h, AH=4Ch
- C) INT 21h, AH=09h
- D) INT 13h

Correct Answer: B

Explanation: INT 21h with AH=4Ch is the preferred and most robust method for program termination in DOS, allowing an exit code to be passed in AL.

79. **What is the concept of "Interrupt Latency"?**

- A) The time it takes for an ISR to execute
- B) The delay between an interrupt request and ISR execution
- C) The time it takes to save registers
- D) The time it takes to restore registers

Correct Answer: B

Explanation: Interrupt latency is the total time from when an interrupt signal is generated until the first instruction of the ISR begins execution.

80. **Which flag must be set for the CPU to respond to maskable interrupts?**

- A) Direction Flag
- B) Trap Flag
- C) Interrupt Flag
- D) Zero Flag

Correct Answer: C

Explanation: The Interrupt Flag (IF) in the Flags register controls whether the CPU will acknowledge maskable hardware interrupts.

81. **What is the primary function of the Programmable Interval Timer (PIT)?**

- A) To manage keyboard input
- B) To generate precise timing signals
- C) To control video output
- D) To handle disk operations

Correct Answer: B

Explanation: The PIT (e.g., 8253/8254 chip) is responsible for generating periodic interrupts, such as the system timer interrupt.

82. **Which IRQ is commonly associated with the serial port COM1?**

- A) IRQ 3
- B) IRQ 4
- C) IRQ 5
- D) IRQ 6

Correct Answer: B

Explanation: IRQ 4 is typically assigned to COM1 (and COM3).

83. **Which IRQ is commonly associated with the serial port COM2?**

- A) IRQ 3
- B) IRQ 4
- C) IRQ 5
- D) IRQ 6

Correct Answer: A

Explanation: IRQ 3 is typically assigned to COM2 (and COM4).

84. What is the purpose of the INT 0x08 (Double Fault) interrupt?

- A) Occurs when two exceptions occur in quick succession
- B) Occurs when a single exception occurs
- C) Occurs when a hardware error is detected
- D) Occurs when a software error is detected

Correct Answer: A

Explanation: A double fault occurs when the CPU attempts to handle an exception, but another exception occurs during the handling of the first one.

85. Which interrupt is used for the Parallel Port (LPT1) (IRQ 7)?

- A) INT 0x70
- B) INT 0x71
- C) INT 0x72
- D) INT 0x7F

Correct Answer: D

Explanation: IRQ 7 is mapped to INT 0x7F.

86. What is the role of the INT 0x05 (Bound Range Exceeded) interrupt?

- A) Occurs when an array index is out of bounds
- B) Occurs when a memory address is out of bounds
- C) Occurs when a register value is out of bounds
- D) Occurs when a stack pointer is out of bounds

Correct Answer: A

Explanation: This interrupt is generated by the BOUND instruction if an array index is outside the specified limits.

87. Which interrupt is used for the INT 0x04 (Overflow) interrupt?

- A) Occurs when an arithmetic operation results in an overflow
- B) Occurs when a stack operation results in an overflow
- C) Occurs when a memory operation results in an overflow
- D) Occurs when an I/O operation results in an overflow

Correct Answer: A

Explanation: This interrupt is generated by the INTO instruction if the Overflow Flag (OF) is set.

88. What is the purpose of the INT 0x03 (Breakpoint) interrupt?

- A) To signal a hardware error
- B) To signal a software error
- C) To allow debuggers to pause program execution
- D) To terminate a program

Correct Answer: C

Explanation: INT 3 is a single-byte instruction (CCh) used by debuggers to set breakpoints.

89. **Which interrupt is used for the INT 0x02 (Non-Maskable Interrupt) interrupt?**

- A) A software-generated interrupt
- B) A hardware-generated interrupt that cannot be ignored
- C) A hardware-generated interrupt that can be ignored
- D) A user-defined interrupt

Correct Answer: B

Explanation: INT 2 is reserved for the NMI, which is typically triggered by critical hardware events.

90. **What is the role of the INT 0x01 (Debug) interrupt?**

- A) Used for single-stepping
- B) Used for breakpoints
- C) Used for hardware errors
- D) Used for software errors

Correct Answer: A

Explanation: INT 1 is generated after every instruction when the Trap Flag (TF) is set, enabling single-step debugging.

91. **Which interrupt is used for the INT 0x00 (Divide Error) interrupt?**

- A) Occurs when division by zero
- B) Occurs when multiplication overflow
- C) Occurs when addition overflow
- D) Occurs when subtraction underflow

Correct Answer: A

Explanation: INT 0 is generated by the CPU when a DIV or IDIV instruction attempts to divide by zero or the quotient is too large.

92. **What is the purpose of the INT 0x13 BIOS service AH=02h ?**

- A) Read sector(s) from disk

- B) Write sector(s) to disk
- C) Format track
- D) Get disk status

Correct Answer: A

Explanation: INT 13h, AH=02h is used to read one or more sectors from a specified disk drive.

93. Which INT 10h service is used to set the video mode?

- A) AH=00h
- B) AH=01h
- C) AH=02h
- D) AH=03h

Correct Answer: A

Explanation: INT 10h, AH=00h sets the video display mode.

94. What is the role of the INT 0x16 BIOS service AH=01h ?

- A) Read character from keyboard (blocking)
- B) Check keyboard buffer for character
- C) Get keyboard status
- D) Set keyboard repeat rate

Correct Answer: B

Explanation: INT 16h, AH=01h checks if a key has been pressed and returns the status without waiting.

95. Which DOS service (AH value) is used to read a string from the keyboard?

- A) 01h
- B) 02h
- C) 0Ah
- D) 09h

Correct Answer: C

Explanation: INT 21h, AH=0Ah reads an entire string from the keyboard into a buffer.

96. What is the purpose of the INT 0x17 BIOS service AH=00h ?

- A) Initialize printer port
- B) Print character
- C) Get printer status

D) Select printer

Correct Answer: A

Explanation: INT 17h, AH=00h initializes the specified printer port.

97. Which INT 21h service is used to get the current date?

A) AH=2Ah

B) AH=2Bh

C) AH=2Ch

D) AH=2Dh

Correct Answer: A

Explanation: INT 21h, AH=2Ah returns the current date.

98. What is the role of the INT 0x1A BIOS service AH=01h ?

A) Set system time

B) Get system time

C) Set system date

D) Get system date

Correct Answer: A

Explanation: INT 1Ah, AH=01h sets the system time.

99. Which INT 21h service is used to get the current time?

A) AH=2Ah

B) AH=2Bh

C) AH=2Ch

D) AH=2Dh

Correct Answer: C

Explanation: INT 21h, AH=2Ch returns the current time.

100. What is the purpose of the INT 0x1A BIOS service AH=00h ?

A) Set system time

B) Get system time

C) Set system date

D) Get system date

Correct Answer: B

Explanation: INT 1Ah, AH=00h gets the current system time from the RTC.

101. Which INT 21h service is used to create a file?

- A) AH=3Ch
- B) AH=3Dh
- C) AH=3Eh
- D) AH=3Fh

Correct Answer: A

Explanation: INT 21h, AH=3Ch creates a new file or truncates an existing one.

102. **What is the role of the INT 0x25 DOS service?**

- A) Absolute disk read
- B) Absolute disk write
- C) Get disk parameters
- D) Verify disk sectors

Correct Answer: A

Explanation: INT 25h performs an absolute disk read, bypassing file system structures.

103. **Which INT 21h service is used to open an existing file?**

- A) AH=3Ch
- B) AH=3Dh
- C) AH=3Eh
- D) AH=3Fh

Correct Answer: B

Explanation: INT 21h, AH=3Dh opens an existing file.

104. **What is the purpose of the INT 0x26 DOS service?**

- A) Absolute disk read
- B) Absolute disk write
- C) Get disk parameters
- D) Verify disk sectors

Correct Answer: B

Explanation: INT 26h performs an absolute disk write, bypassing file system structures.

105. **Which INT 21h service is used to close a file?**

- A) AH=3Ch
- B) AH=3Dh
- C) AH=3Eh
- D) AH=3Fh

Correct Answer: C

Explanation: INT 21h, AH=3Eh closes a file handle.

106. **What is the role of the INT 0x27 DOS service?**

- A) Terminate and Stay Resident (TSR)
- B) Terminate program
- C) Load program
- D) Execute program

Correct Answer: A

Explanation: INT 27h is used to terminate a program but keep it resident in memory (TSR).

107. **Which INT 21h service is used to read from a file or device?**

- A) AH=3Ch
- B) AH=3Dh
- C) AH=3Eh
- D) AH=3Fh

Correct Answer: D

Explanation: INT 21h, AH=3Fh reads data from a file or device into a buffer.

108. **What is the purpose of the INT 0x28 DOS service?**

- A) DOS Idle Call
- B) DOS Busy Call
- C) DOS Error Call
- D) DOS Success Call

Correct Answer: A

Explanation: INT 28h is called by DOS when it is idle, allowing TSRs to perform background tasks.

109. **Which INT 21h service is used to write to a file or device?**

- A) AH=40h
- B) AH=3Fh
- C) AH=3Eh
- D) AH=3Dh

Correct Answer: A

Explanation: INT 21h, AH=40h writes data from a buffer to a file or device.

110. What is the role of the INT 0x29 DOS service?

- A) Fast console output
- B) Fast console input
- C) Fast disk output
- D) Fast disk input

Correct Answer: A

Explanation: INT 29h provides a faster way to output characters to the console.

111. Which INT 21h service is used to move the file pointer?

- A) AH=41h
- B) AH=42h
- C) AH=43h
- D) AH=44h

Correct Answer: B

Explanation: INT 21h, AH=42h moves the read/write pointer within a file.

112. What is the purpose of the INT 0x33 BIOS service?

- A) Mouse services
- B) Joystick services
- C) Sound services
- D) Printer services

Correct Answer: A

Explanation: INT 33h provides various mouse-related functions.

113. Which INT 21h service is used to delete a file?

- A) AH=41h
- B) AH=42h
- C) AH=43h
- D) AH=45h

Correct Answer: A

Explanation: INT 21h, AH=41h deletes a specified file.

114. What is the role of the INT 0x15 BIOS service AH=87h ?

- A) Move extended memory block
- B) Get extended memory size
- C) Set extended memory size

D) Test extended memory

Correct Answer: A

Explanation: INT 15h, AH=87h is used to move a block of data in extended memory.

115. Which INT 21h service is used to get or set file attributes?

A) AH=41h

B) AH=42h

C) AH=43h

D) AH=44h

Correct Answer: C

Explanation: INT 21h, AH=43h allows programs to read or modify file attributes (read-only, hidden, system, etc.).

116. What is the purpose of the INT 0x15 BIOS service AH=88h ?

A) Move extended memory block

B) Get extended memory size

C) Set extended memory size

D) Test extended memory

Correct Answer: B

Explanation: INT 15h, AH=88h returns the amount of extended memory available in kilobytes.

117. Which INT 21h service is used to duplicate a file handle?

A) AH=45h

B) AH=46h

C) AH=47h

D) AH=48h

Correct Answer: A

Explanation: INT 21h, AH=45h creates a new file handle that refers to the same file as an existing handle.

118. What is the role of the INT 0x15 BIOS service AH=C0h ?

A) Get configuration information

B) Set configuration information

C) Get memory map

D) Set memory map

Correct Answer: A

Explanation: INT 15h, AH=C0h returns information about the system configuration.

119. Which INT 21h service is used to force a duplicate file handle to a specific value?

- A) AH=45h
- B) AH=46h
- C) AH=47h
- D) AH=48h

Correct Answer: B

Explanation: INT 21h, AH=46h forces a specific file handle to refer to the same file as another handle.

120. What is the purpose of the INT 0x15 BIOS service AH=E801h ?

- A) Get extended memory size (newer)
- B) Get conventional memory size
- C) Get memory map
- D) Get CPU information

Correct Answer: A

Explanation: INT 15h, AH=E801h is a newer and more reliable way to get extended memory size.

121. Which INT 21h service is used to get the current directory?

- A) AH=47h
- B) AH=48h
- C) AH=49h
- D) AH=4Ah

Correct Answer: A

Explanation: INT 21h, AH=47h returns the current directory for a specified drive.

122. What is the role of the INT 0x15 BIOS service AH=E820h ?

- A) Get memory map (newer)
- B) Get extended memory size
- C) Get conventional memory size
- D) Get CPU information

Correct Answer: A

Explanation: INT 15h, AH=E820h is a modern method to get a detailed memory map of the system.

123. Which INT 21h service is used to allocate memory?

- A) AH=48h
- B) AH=49h
- C) AH=4Ah
- D) AH=4Bh

Correct Answer: A

Explanation: INT 21h, AH=48h allocates a block of memory (in paragraphs).

124. What is the purpose of the INT 0x15 BIOS service AH=F000h ?

- A) Power management
- B) APM (Advanced Power Management) functions
- C) ACPI (Advanced Configuration and Power Interface) functions
- D) System management mode

Correct Answer: B

Explanation: INT 15h, AH=F000h provides access to APM functions for power management.

125. Which INT 21h service is used to free allocated memory?

- A) AH=48h
- B) AH=49h
- C) AH=4Ah
- D) AH=4Bh

Correct Answer: B

Explanation: INT 21h, AH=49h frees a previously allocated memory block.

126. What is the role of the INT 0x15 BIOS service AH=F800h ?

- A) PCI BIOS services
- B) USB BIOS services
- C) SCSI BIOS services
- D) Network BIOS services

Correct Answer: A

Explanation: INT 15h, AH=F800h provides access to PCI BIOS functions for interacting with PCI devices.

127. Which INT 21h service is used to resize an allocated memory block?

- A) AH=48h

- B) AH=49h
- C) AH=4Ah
- D) AH=4Bh

Correct Answer: C

Explanation: INT 21h, AH=4Ah resizes an allocated memory block.

128. What is the purpose of the INT 0x15 BIOS service AH=D000h ?

- A) DPMI (DOS Protected Mode Interface) services
- B) VESA BIOS services
- C) EMS (Expanded Memory Specification) services
- D) XMS (Extended Memory Specification) services

Correct Answer: A

Explanation: INT 15h, AH=D000h provides access to DPMI functions, allowing DOS programs to run in protected mode.

129. Which INT 21h service is used to load and execute a program?

- A) AH=4Bh
- B) AH=4Ch
- C) AH=4Dh
- D) AH=4Eh

Correct Answer: A

Explanation: INT 21h, AH=4Bh loads and executes a program (EXEC function).

130. What is the role of the INT 0x15 BIOS service AH=4F00h ?

- A) VESA BIOS services
- B) DPMI services
- C) EMS services
- D) XMS services

Correct Answer: A

Explanation: INT 15h, AH=4F00h provides access to VESA BIOS extensions for advanced video modes.

131. Which INT 21h service is used to find the first matching file?

- A) AH=4Eh
- B) AH=4Fh
- C) AH=50h

D) AH=51h

Correct Answer: A

Explanation: INT 21h, AH=4Eh finds the first file that matches a specified file name and attributes.

132. What is the purpose of the INT 0x15 BIOS service AH=86h ?

A) Wait function

B) Delay function

C) Timer function

D) Sleep function

Correct Answer: A

Explanation: INT 15h, AH=86h provides a wait function, pausing execution for a specified number of microseconds.

133. Which INT 21h service is used to find the next matching file?

A) AH=4Eh

B) AH=4Fh

C) AH=50h

D) AH=51h

Correct Answer: B

Explanation: INT 21h, AH=4Fh finds the next file that matches the criteria set by a previous AH=4Eh call.

134. What is the role of the INT 0x15 BIOS service AH=89h ?

A) Switch to protected mode

B) Switch to real mode

C) Get CPU mode

D) Set CPU mode

Correct Answer: A

Explanation: INT 15h, AH=89h is used to switch the CPU from real mode to protected mode.

135. Which INT 21h service is used to get the DOS version number?

A) AH=30h

B) AH=31h

C) AH=32h

D) AH=33h

Correct Answer: A

Explanation: INT 21h, AH=30h returns the DOS version number.

136. What is the purpose of the INT 0x15 BIOS service AH=8A00h ?

- A) Get device busy status
- B) Set device busy status
- C) Get device ready status
- D) Set device ready status

Correct Answer: A

Explanation: INT 15h, AH=8A00h is used to check the busy status of a device.

137. Which INT 21h service is used to keep a program resident (TSR)?

- A) AH=31h
- B) AH=32h
- C) AH=33h
- D) AH=34h

Correct Answer: A

Explanation: INT 21h, AH=31h terminates a program but keeps it resident in memory, similar to INT 27h but more flexible.

138. What is the role of the INT 0x15 BIOS service AH=8B00h ?

- A) Get device ID
- B) Set device ID
- C) Get device capabilities
- D) Set device capabilities

Correct Answer: A

Explanation: INT 15h, AH=8B00h returns the ID of a specified device.

139. Which INT 21h service is used to get or set the system date?

- A) AH=2Ah/2Bh
- B) AH=2Ch/2Dh
- C) AH=30h/31h
- D) AH=32h/33h

Correct Answer: A

Explanation: INT 21h, AH=2Ah gets the date, and AH=2Bh sets the date.

140. What is the purpose of the INT 0x15 BIOS service AH=8C00h ?

- A) Get device status
- B) Set device status
- C) Get device error code
- D) Set device error code

Correct Answer: A

Explanation: INT 15h, AH=8C00h returns the status of a device.

141. Which INT 21h service is used to get or set the system time?

- A) AH=2Ah/2Bh
- B) AH=2Ch/2Dh
- C) AH=30h/31h
- D) AH=32h/33h

Correct Answer: B

Explanation: INT 21h, AH=2Ch gets the time, and AH=2Dh sets the time.

142. What is the role of the INT 0x15 BIOS service AH=8D00h ?

- A) Get device information
- B) Set device information
- C) Get device driver address
- D) Set device driver address

Correct Answer: A

Explanation: INT 15h, AH=8D00h returns detailed information about a device.

143. Which INT 21h service is used to get the drive parameters?

- A) AH=19h
- B) AH=1Ah
- C) AH=1Bh
- D) AH=1Ch

Correct Answer: C

Explanation: INT 21h, AH=1Bh returns the default drive data, and AH=1Ch returns data for a specific drive.

144. What is the purpose of the INT 0x15 BIOS service AH=8E00h ?

- A) Get device power state
- B) Set device power state
- C) Get device interrupt routing

D) Set device interrupt routing

Correct Answer: A

Explanation: INT 15h, AH=8E00h returns the current power state of a device.

145. Which INT 21h service is used to rename a file?

A) AH=56h

B) AH=57h

C) AH=58h

D) AH=59h

Correct Answer: A

Explanation: INT 21h, AH=56h renames a file or directory.

146. What is the role of the INT 0x15 BIOS service AH=8F00h ?

A) Get device wake-up event

B) Set device wake-up event

C) Get device configuration

D) Set device configuration

Correct Answer: A

Explanation: INT 15h, AH=8F00h returns information about the device that caused a wake-up event.

147. Which INT 21h service is used to create a directory?

A) AH=39h

B) AH=3Ah

C) AH=3Bh

D) AH=3Ch

Correct Answer: A

Explanation: INT 21h, AH=39h creates a new directory.

148. What is the purpose of the INT 0x15 BIOS service AH=90h ?

A) Device install check

B) Device uninstall check

C) Device driver install

D) Device driver uninstall

Correct Answer: A

Explanation: INT 15h, AH=90h checks if a device is installed and returns its capabilities.

149. Which INT 21h service is used to remove a directory?

- A) AH=39h
- B) AH=3Ah
- C) AH=3Bh
- D) AH=3Ch

Correct Answer: B

Explanation: INT 21h, AH=3Ah removes an empty directory.

150. What is the role of the INT 0x15 BIOS service AH=91h ?

- A) Device event notification
- B) Device error notification
- C) Device status notification
- D) Device configuration notification

Correct Answer: A

Explanation: INT 15h, AH=91h allows programs to register for device event notifications.

151. Which INT 21h service is used to change the current directory?

- A) AH=39h
- B) AH=3Ah
- C) AH=3Bh
- D) AH=3Ch

Correct Answer: C

Explanation: INT 21h, AH=3Bh changes the current directory.

152. What is the purpose of the INT 0x15 BIOS service AH=A0h ?

- A) DPMI (DOS Protected Mode Interface) services
- B) VESA BIOS services
- C) EMS (Expanded Memory Specification) services
- D) XMS (Extended Memory Specification) services

Correct Answer: A

Explanation: INT 15h, AH=A0h provides access to DPMI services, allowing DOS programs to manage protected mode memory.

153. Which INT 21h service is used to get the disk free space?

- A) AH=36h
- B) AH=37h

C) AH=38h

D) AH=39h

Correct Answer: A

Explanation: INT 21h, AH=36h returns the free disk space for a specified drive.

154. What is the role of the INT 0x15 BIOS service AH=B0h ?

A) APM (Advanced Power Management) services

B) ACPI (Advanced Configuration and Power Interface) services

C) PCI BIOS services

D) USB BIOS services

Correct Answer: A

Explanation: INT 15h, AH=B0h provides access to APM functions for power management.

155. Which INT 21h service is used to get the country-dependent information?

A) AH=38h

B) AH=39h

C) AH=3Ah

D) AH=3Bh

Correct Answer: A

Explanation: INT 21h, AH=38h returns country-specific information like date and time formats.

156. What is the purpose of the INT 0x15 BIOS service AH=C1h ?

A) Get CPU ID

B) Get CPU features

C) Get CPU speed

D) Get CPU temperature

Correct Answer: A

Explanation: INT 15h, AH=C1h returns the CPU ID.

157. Which INT 21h service is used to get the verify flag status?

A) AH=54h

B) AH=55h

C) AH=56h

D) AH=57h

Correct Answer: A

Explanation: INT 21h, AH=54h returns the status of the verify flag, which controls disk write verification.

158. What is the role of the INT 0x15 BIOS service AH=C2h ?

- A) Mouse services
- B) Keyboard services
- C) PS/2 mouse services
- D) PS/2 keyboard services

Correct Answer: C

Explanation: INT 15h, AH=C2h provides PS/2 mouse specific services.

159. Which INT 21h service is used to set the verify flag?

- A) AH=2Eh
- B) AH=2Fh
- C) AH=30h
- D) AH=31h

Correct Answer: A

Explanation: INT 21h, AH=2Eh sets the verify flag, enabling disk write verification.

160. What is the purpose of the INT 0x15 BIOS service AH=C3h ?

- A) Enable/disable cache
- B) Get cache status
- C) Set cache status
- D) Flush cache

Correct Answer: A

Explanation: INT 15h, AH=C3h allows enabling or disabling the CPU cache.

161. Which INT 21h service is used to get the process ID?

- A) AH=50h
- B) AH=51h
- C) AH=52h
- D) AH=53h

Correct Answer: B

Explanation: INT 21h, AH=51h returns the Process ID (PID) of the currently running program.

162. What is the role of the INT 0x15 BIOS service AH=C4h ?

- A) Get CPU clock speed
- B) Set CPU clock speed
- C) Get CPU temperature
- D) Set CPU temperature

Correct Answer: A

Explanation: INT 15h, AH=C4h returns the CPU clock speed.

163. Which INT 21h service is used to get the drive transfer address?

- A) AH=2Fh
- B) AH=30h
- C) AH=31h
- D) AH=32h

Correct Answer: A

Explanation: INT 21h, AH=2Fh returns the Disk Transfer Address (DTA).

164. What is the purpose of the INT 0x15 BIOS service AH=D8h ?

- A) Get BIOS date
- B) Get BIOS version
- C) Get BIOS copyright
- D) Get BIOS features

Correct Answer: A

Explanation: INT 15h, AH=D8h returns the BIOS date.

165. Which INT 21h service is used to set the drive transfer address?

- A) AH=1Ah
- B) AH=1Bh
- C) AH=1Ch
- D) AH=1Dh

Correct Answer: A

Explanation: INT 21h, AH=1Ah sets the Disk Transfer Address (DTA).

166. What is the role of the INT 0x15 BIOS service AH=D9h ?

- A) Get BIOS date
- B) Get BIOS version
- C) Get BIOS copyright

D) Get BIOS features

Correct Answer: B

Explanation: INT 15h, AH=D9h returns the BIOS version string.

167. Which INT 21h service is used to get the current default drive?

A) AH=19h

B) AH=1Ah

C) AH=1Bh

D) AH=1Ch

Correct Answer: A

Explanation: INT 21h, AH=19h returns the current default drive (0=A, 1=B, etc.).

168. What is the purpose of the INT 0x15 BIOS service AH=DAh ?

A) Get BIOS date

B) Get BIOS version

C) Get BIOS copyright

D) Get BIOS features

Correct Answer: C

Explanation: INT 15h, AH=DAh returns the BIOS copyright string.

169. Which INT 21h service is used to set the default drive?

A) AH=0Eh

B) AH=0Fh

C) AH=10h

D) AH=11h

Correct Answer: A

Explanation: INT 21h, AH=0Eh sets the default drive.

170. What is the role of the INT 0x15 BIOS service AH=DBh ?

A) Get BIOS date

B) Get BIOS version

C) Get BIOS copyright

D) Get BIOS features

Correct Answer: D

Explanation: INT 15h, AH=DBh returns a bitmask indicating various BIOS features.

171. Which INT 21h service is used to get the file creation date/time?

- A) AH=57h
- B) AH=58h
- C) AH=59h
- D) AH=5Ah

Correct Answer: A

Explanation: INT 21h, AH=57h (subfunction 00h) gets the file date and time.

172. What is the purpose of the INT 0x15 BIOS service AH=DC00h ?

- A) Get PnP (Plug and Play) BIOS entry point
- B) Get APM BIOS entry point
- C) Get VESA BIOS entry point
- D) Get DPMI BIOS entry point

Correct Answer: A

Explanation: INT 15h, AH=DC00h returns the entry point for PnP BIOS functions.

173. Which INT 21h service is used to set the file creation date/time?

- A) AH=57h
- B) AH=58h
- C) AH=59h
- D) AH=5Ah

Correct Answer: A

Explanation: INT 21h, AH=57h (subfunction 01h) sets the file date and time.

174. What is the role of the INT 0x15 BIOS service AH=E000h ?

- A) Get CPU information
- B) Get memory information
- C) Get BIOS information
- D) Get system information

Correct Answer: A

Explanation: INT 15h, AH=E000h provides detailed information about the CPU.

175. Which INT 21h service is used to get the extended error information?

- A) AH=59h
- B) AH=5Ah
- C) AH=5Bh
- D) AH=5Ch

Correct Answer: A

Explanation: INT 21h, AH=59h returns extended error information after a failed DOS call.

176. What is the purpose of the INT 0x15 BIOS service AH=E200h ?

- A) Get BIOS features
- B) Get BIOS version
- C) Get BIOS date
- D) Get BIOS copyright

Correct Answer: A

Explanation: INT 15h, AH=E200h returns a comprehensive list of BIOS features.

177. Which INT 21h service is used to create a temporary file?

- A) AH=5Ah
- B) AH=5Bh
- C) AH=5Ch
- D) AH=5Dh

Correct Answer: A

Explanation: INT 21h, AH=5Ah creates a unique temporary file.

178. What is the role of the INT 0x15 BIOS service AH=E400h ?

- A) Get CPU temperature
- B) Get CPU fan speed
- C) Get CPU voltage
- D) Get CPU usage

Correct Answer: A

Explanation: INT 15h, AH=E400h returns the CPU temperature.

179. Which INT 21h service is used to create a new file with a unique name?

- A) AH=5Bh
- B) AH=5Ch
- C) AH=5Dh
- D) AH=5Eh

Correct Answer: B

Explanation: INT 21h, AH=5Bh creates a new file with a unique name, preventing conflicts.

180. What is the purpose of the INT 0x15 BIOS service AH=E600h ?

- A) Get CPU temperature
- B) Get CPU fan speed
- C) Get CPU voltage
- D) Get CPU usage

Correct Answer: B

Explanation: INT 15h, AH=E600h returns the CPU fan speed.