SOLVED BY ADIL ALVI

CS304 CURRENT PAPERS FALL 2021

1) Write key components of STL?
STL consists of three key components • Containers • Iterators • Algorithms

2) Protected statement is an exception handling statement comment this statement with explanation?
It means that the normal flow of the program is interrupted and that the runtime environment attempts to find an exception handler—a block of code that can handle a particular type of error.

3) Write table of container type and iterative type?

Container Type	Iterator Type	Reason
vector	random access	(as we can access any element of vector using its index so we can use random access iterator)
deque	random access	(in deque we can add elements only in front and back however we can access any element of deque using its index so we can use random access Iterator)
list	bidirectional	(in list we can move in both directions in sequence, however cannot access an element at specific index randomly so we can use bidirectional iterator with list)

4) Write types stack unwinding and explain one type with code?
The process of removing function entries from function call stack at run time is called Stack Unwinding.
There are two types of Stack Unwinding
1) Nested Functions 2) Nested Try catch blocks

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1) Nested Try catch blocks
When an exception will be thrown from a try block control will go to catch block of that try block if it is not appropriate catch block then control will go to catch blocks of other try blocks above it one by one, Stack Unwinding will occur in following order in below example,

```
int main( ) {
try {
try {
throw 1;
}
catch( float ) { }
}
catch( int ) {
}
return 0;
}
```

5) Write abstract class with example?
An abstract class is a class that is designed to be specifically used as a base class. In C++, we can make a class abstract by making its function(s) pure virtual. Conversely, a class with no pure virtual function is a concrete class (which object can be instantiated)

6) Write override function of parent class?
Function overriding is a feature that allows us to have a same function in child class which is already present in the parent class. A child class inherits the data members and member functions of parent class, but when you want to override a functionality in the child class then you can use function overriding.

7) What is Graceful Termination?
Program can be designed in such a way that instead of abnormal termination, that causes the wastage of resources, program performs clean up tasks, mean we add check for expected errors (using if conditions)
Example:

```
int Quotient (int a, int b ) {
if(b == 0){
cout << “Denominator can’t “ << “ be zero” << endl;
// Do local clean up
exit(1);
}
return a / b;
}
```

8) Write Techniques for Error Handling:
a. Abnormal termination b. Graceful termination c. Return the illegal value
d. Return error code from a function e. Exception handling

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9) What is type parameters?

Type parameters, also known as type variables, are used as placeholders to indicate that a type will be assigned to the class at runtime. The following list contains the standard type parameters for each use case: 1) E: Element, 2) K: Key, 3) N: Number, 4) T: Type, 5) V: Value

10) Write types of Copy Constructor?

Default Copy constructor:

The compiler defines the default copy constructor. If the user defines no copy constructor, compiler supplies its constructor.

User Defined constructor:

The programmer defines the user-defined constructor

11) Write program to comparing two strings?

```
#include<iostream>
#include<string.h>
#include<stdio.h>
using namespace std;
int main()
{
	char str1[100], str2[100];
	cout<<"\n Enter First String : ";
	gets(str1);
	cout<<"\n Enter Second String : ";
	gets(str2);
	if(strcmp(str1, str2)==0)  //strcmp() is a library function, used to compare the two strings.
	{
		cout<<"\n Strings are Equal!!!";
	}
	else
	{
		cout<<"\n Strings are Not Equal!!!";
	}
	return 0;
}
```

12) Write a program with using built-in function?

We create a program to calculate 3^4 using built-in function

```
#include <iostream>
#include <cmath>
using namespace std;
int main() {
    int threeExpFour = pow(3, 4);
    cout << "3^4 is " << threeExpFour << endl;
    return 0;
}
```

13) Difference between partial and complete specialization?

In an incomplete specialization, also called a partial specialization, only some individuals of the parent class are specialized (that is, have unique attributes). ... In a complete specialization, all individuals of the parent class have one or more unique attributes that are not common to the generalized (parent) class.

14) Write a program of copy constructer?

```
#include<iostream>
using namespace std;
class ABC {
public:ABC(){
	cout<<"Constructor is called automatically";
	cout<<"at the time of execution"<<endl;
}
 void display(){
cout<<"hello world";
}
};
int main() {
   ABC ob1,ob2;
   ob1.display();
   ob2.display();
   return 0;
}
```

15) What is First-class Containers? Also writes its functions?

Sequence and associative containers are collectively referred to as the first-class containers
Functions for First-class Containers
1)begin(), 2)end(), 3) rbegin(), 4) rend(), 5) erase(iterator), 6) erase(iterator, iterator), 7) clear()

16) How to create template classes?

To instantiate a template class explicitly, follow the template keyword by a declaration (not definition) for the class, with the class identifier followed by the template arguments.

17) What is direct base class and indirect base class explain with example?

Direct Base Class

A direct base class is explicitly listed in a derived class's header with a colon (:)

```
class Child1:public Parent1 { // Here Parent1 is Direct Base Class of Child1
…
};
```

Indirect Base Class

An indirect base class is not explicitly listed in a derived class's header with a colon (:)
It is inherited from two or more levels up the hierarchy of inheritance

```
class GrandParent {
…
```

```
};
class Parent1: public GrandParent {
…
};
class Child1:public Parent1 { // Here GrandParent is InDirect Base Class of
Child1
…
};
```

18) Write a code of complete specialization may inherit from a complete specialization?

```
template< >
class B< double* > : public A< float* >
{ … };
int main() {
A< float* > obj1;
B< double* > obj2;
return 0;
}
```

19) Explain Function Overloading and Function Overriding with example?

Function Overloading:

Two functions in same class with same name but different parameters and return type.

Example:

```
class Parent {
public:
void Func1();
void Func1(int);
};
class Child: public
Parent {
public:
void Func1();
};
```

Function Overriding

Two functions in two base derived classes

Example:

```
class Parent {
public:
void Func1();
void Func1(int);
};
class Child: public
Parent {
public:
void Func1();
```

```
};
```

20) What is Virtual Constructor?

The virtual mechanism works only when we have a base class pointer to a derived class object. In C++, the constructor cannot be virtual, because when a constructor of a class is executed there is no virtual table in the memory, means no virtual pointer defined yet.

21) Write Syntax of abstract class?

```
public abstract class Shape{
        String name;
         public abstract double area();
         public String name()  {
                 Return name;
          }
          // other stuff
}
```

22) Write Exception Handling Process?

• Programmer writes the code that is suspected to cause an exception in try block
• Code section that encounters an error throws an object that is used to represent exception
• Catch blocks follow try block to catch the object thrown

23) Write 5 Error handling disadvantages?

Programmer sometimes has to change the design to incorporate error handling
Programmer has to check the return type of the function to know whether an error has occurred
Programmer of calling function can ignore the return value
The result of the function might contain illegal value, this may cause a system crash later
Program's Complexity Increases

24) Can we overload constructor function?

Constructors can be overloaded in a similar way as function overloading. Overloaded constructors have the same name (name of the class) but the different number of arguments. Depending upon the number and type of arguments passed, the corresponding constructor is called.

25) Write Cursor 3 operations?

• T* first() • T* beyond() • T* next(T*)

26) define forward and bidirectional iterators?

Forward iterators are iterators that can be used to access the sequence of elements in a range in the direction that goes from its beginning towards its end while
A Bidirectional Iterator is an iterator that can be both incremented and decremented.

27) Write a program of error handling?

```
int main(){
if( function1() ) {
```

```
if( function2() ) {
if( function3() ) {
...
}
else cout << “Error Z has occurred”;
}
else cout << “Error Y has occurred”;
}
else cout << “Error X has occurred”;
return 0;
}
```

28) List down three cases in which copy constructer are called

1) When an existing object is assigned an object of its own class
2) If a functions receives as argument, passed by value, an object of a class
3) When a function returns (by value) an object of the class

29) Is it possible to have virtual constructor justify your answer?

Constructor cannot be virtual, because when constructor of a class is executed there is no table in the memory, means no virtual pointer defined yet. Hence the constructor should always be non-virtual.

30) State any conflict that may rise due to multiple inheritance?

If more than one base class has a function with same signature then the child will have two copies of that function calling such function will result in ambiguity.

31) Write a program for partial specialization may inherit from a complete specialization?

```
template< class T >
class B< T* > : public A< float* >
{ … };
int main() {
A< float* > obj1;
B< int* > obj2;
return 0;
}
```

32) aik program dia hwa copy constructor or assignment operator ka or main function likhna tha k copy constructor kesy call kry gy or assignment operator kesy call kry gy.

```
int main
{
class teacher T1(30);
teacher t2;
T1(T2); //copy constructor
T1=T2; // overloaded assignment operator
}
```

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CS304 Practical Questions:

1) Write a c++ program using non template class a as an friend class of class b? 5
2) 1 program given tha base class r divde class kn kn c h ve btani thi (yes/no)? 5
3) Protected statement is an exception handling statement comment this statement with explanation
4) Program tha inheritance exception k bary me
5) Direct base class or indirect base class btani thi ik code likha hwa tha uski...3marks
6) Class di hui thi usma indirect or direct base class batani thi 3 marks
7) Friend function ka batana tha k wo puri class ko friend banata hai ya sirf jis ma declare kia ho
8) write code specialized container
9) Write code template with copy vector
10) Specialized class wala program
12) Sirf aik theory ka question tha jis ma pocha tha key hm base ki jga derived class use kr sakty hay lkn kiya base bh drived ke liye use ho sakti ya nahi give reason
13) Class di hoi thi aur dosri likhni aur friend function banana tha
14) 1 template function banana tha jo koi b data type ka variable le kr os ki value double kr k return kry . jese k int x lega to x*2 return kre ga
15) 1 logic error find krna tha os mn file read ho rhi thi writeable mode main or code try catch block k andr likha hua tha
16) Write the iterators for given deque list stack queue
17) Output btani thi template k topic se programm aya test 1 test 2 test 3 test 4 wala tha
18) 3 marks k question me ak parameters *2 wala code likhna tha
19) a and b friend relation wala code likhna tha.
20) Virtual destructor sy related program tha output btani thi
21) Exception handling ka aik program tha us ki output btani thi
22) Base class and child class di hoi thi us me member functions identify krny thy child class k.

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