20K-4112 OOP MID – I RAZA HASAN

1.) Why constructor name is similar to the class name?

Constructors are named as same as class so that the compiler knows beforehand which method to call when an object is created.

2.) Why user defined copy constructor is required?

A user defined copy constructor is needed when an object has pointer or any runtime allocation.

3.) Why user defined destructor is required?

Compiler always creates a default constructor and it work fine unless we have dynamically allocated memory or pointer in class.

4.) Is it necessary to have a setter function if we already defined a parameterize constructor?

Yes, you initialize the value using a constructor but after object creation a setter is required to modify the value of a private attribute.

5.) How can you initialize constant data members inside a class?

Through a member initializer list.

```
Class Student{
private:
const string name;
public:
Student(string nm):name(nm){}
};
```

6.) Constructor is a function and still does not return a value, why?

Constructor it's not called by the code it's called by the memory allocation and object initialization code in the runtime. Its return value is opaque to the user that why you cannot specify it.

7.) Why the ->this keyword exist in OOP?

This pointer holds the address of the current object working in the class. They are also used in Calling functions in chain by returning the reference of current object

8.) Where inline function is created in the code and what are their functionality?

When an inline function is called the code of the function is brought to the main at the point at which the function is called. Inline is a request to the compiler and it will make the function inline when seems necessary. Function inside the class is by default inline but if the function of class is defined outside the inline keyword must be used in its declaration or at the definition of the function.

9.) When the compiler does not perform inlining in a function and write down the advantages and disadvantage of inlining?

If a function contains a loop, switch, Goto statement and static variables. When a function is recursive or its return type is other than void and the return statement doesn't exist in function body.

Advantages:

- Function call overhead does not occur.
- It also saves overhead of a return call from a function
- It is useful if it is small for embedded systems because inline can yield less code than the function call preamble and return.

Disadvantages:

- The added variable from inline function consumes additional registers
- If you use too many inline functions the size of the main executable file will be large because of duplicate code.
- Inline function may increase compile time overhead if someone changes the code inside the inline function then all the calling location will be recompiled.
- In embedded system code size is more imp than speed that why inline function may not be useful.

10.) What is static keyword? What are static data members and functions?

A variable that is a part of a class but not part of any object of that class can be accessed outside the class directly only if the variable is public, it does not get destroyed when the objects do and stay alive till runtime.

```
class Student{
static int NumberofStudents;
};

int Student::Numberofstudents=50;
```

We can access static data members from two ways:

1. Using dot operator(.)
2. Using Scope resolution operator (: :)

```
int main(){
Student obj;
Obj.NumberofStudents=1;
Student::NumberofStudents=1;
```

Static member function are made to access static data members and cannot access non static variables.

11.) Why this pointer is not passed to static member function?

Static member function does not access non static data members.

12.) Can there be more than one destructor in a class?

No there is only one destructor (no parameters, no return type) in a class.

13.) Can constructor and destructor be constant?

They cannot be constant as they used to modify the object to a well-defined state or to clean the memory occupied by the object.

14.) Is this pointer used in constant member function?

Yes, it is passes as constant pointer to const data in case of constant member function.

15.) What is the keyword Mutable?

Mutable data members are those members whose values can be changed in runtime even if the object is of constant type.

16.) What is the difference between encapsulation and abstraction explain in real time example?

Encapsulation is a way to achieve *"information hiding"* so you don't *"need to know the internal working of the mobile phone to operate"* with it. You have an *interface* to use the device behavior without knowing implementation details.

Abstraction on the other side, can be explained as the capability to use the same *interface* for different objects. Different implementations of the same interface can exist. Details are hidden by *encapsulation*.

17.) How constructor is different from a normal member function?

It has a same name as class, doesn't have a return type, it is automatically called by the compiler when the object is created if we do not specific a constructor the compiler with made a default constructor for us.

18.) What is copy constructor?

A copy constructor is a member function which initializes an object data member by using another object of the same class.

19.) What is the use of parametrized constructor? Can there be more than one constructor?

It is used to overload constructor. Yes, it is called Constructor Overloading which means many constructors but with different number of parameters.

20.) Explain shallow copy?

Default constructor does only shallow copy. Shallow copy in objects when some variables are defined in heap memory.

21.) Explain Deep Copy?

Deep copy is possible only with user defined copy constructor. We make sure that pointers of copied object point to new memory locations.

22.) Can we make copy constructor private?

Yes, a copy constructor can be made private. When we make a copy constructor private in a class, objects of that class become non-copyable. This is particularly useful when our class has pointers or dynamically allocated resources.

23.) Why argument to a copy constructor must be passed as a reference?

It is necessary to pass object as reference and not by value because **if you pass it by value its copy is constructed using the copy constructor**. This means the copy constructor would call itself to make copy. This process will go on until the compiler runs out of memory.

24.) Why argument to a copy constructor should be const?

When we create our own copy constructor, we pass an object by reference and we generally pass it as a const reference. One reason for passing const reference is, we should use const in C++ wherever possible **so that objects are not accidentally modified.**

25.) What is the difference between structure and a class?

Class member function and variables are by default private whereas in structure they are by default public.