

Mid-Term Exam Revision

Week 8, Lecture 2

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BIT 2400 (Intermediate Programming)
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Multiple Choice Questions

- **Question:** What is the difference between constructor and destructor?
 1. Constructor and destructor are member variables of a structure that are executed when an object of the structure is created and destroyed, respectively.
 2. Constructor and destructor are member variables of a class that are executed when an object of the class is created and destroyed, respectively.
 3. Constructor and destructor are member functions of a class that are executed when an object of the class is created and destroyed, respectively.
 4. Constructor and destructor are member variables of a function that are executed when an object of the class is created and destroyed, respectively.

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Multiple Choice Questions

- **Question:** When ClassB is inherited from ClassA, what is the order in which the constructors of those classes are called
 1. ClassA first Class B next
 2. ClassB first Class A next
 3. ClassB's only as it is the child class
 4. ClassA's only as it is the parent class

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Multiple Choice Questions

- **Question:** Which of the following members do get inherited from a base class to derived class
 1. Public and private
 2. Public and protected
 3. Protected and private
 4. All of the above mentioned options

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Multiple Choice Questions

- **Question:** Using a pointer before initialization may lead to
 1. Compile time error
 2. Run time error
 3. Both option 1 and 2
 4. None of above

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Multiple Choice Questions

- **Question:** Which of the options below describes Memory Leak most accurately?
 1. CPU cycles are not released by the program
 2. Memory is allocated but not released back to the operating system
 3. Memory is allocated but not released back to hard disk
 4. CPU cycles are not released by main function

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Multiple Choice Questions

- **Question:** What is the default access for classes in C++
 1. Public
 2. Private
 3. Protected
 4. Void

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Multiple Choice Questions

- **Question:** Association between two classes ClassA and ClassB in object oriented programming means
 1. ClassA owns ClassB
 2. ClassA uses ClassB
 3. All of above
 4. None of above

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Multiple Choice Questions

- **Question:** Aggregation between two classes ClassA and ClassB in object oriented programming means
 1. ClassA owns ClassB
 2. ClassA uses ClassB
 3. ClassA is derived from ClassB
 4. ClassB is derived from ClassA

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Conceptual Questions

- What are the benefits of object oriented programming in designing and developing programs? List any three benefits?

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Conceptual Questions

- What is the difference between function declaration vs. function implementation?

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Conceptual Questions

- Why do we use get and set functions in object oriented programming? What is the benefit?

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Conceptual Questions

- Why should we define classes in header files and provide implementation in cpp files? What is the advantage or why it is considered a good programming practice?

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Conceptual Questions

- What is the key criteria based on which you would choose between composition, aggregation and inheritance in object oriented programming?

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Scenario Questions

- What will be the **exact** output of this program?
- Assuming that we have already included all the required libraries and namespaces

```
class Employee {
    int age;

    void getAge();
};

void Employee::setAge(int i){
    age = i;
}

int Employee::getAge(){
    cout << age;
    return age;
}

void main () {

    Employee myEmp;
    myEmp.setAge(5);
    cout << myEmp.getAge();

}
```

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Scenario Questions

- What will be the **exact** output of this program?
- Assuming that we have already included all the required libraries and namespaces

```
class Coordinate2D{

private:
    double x;
    double y;
    Coordinate2D();

public:
    double getX() { return x;}
    double getY() { return y;}
    void setX(double newX) { x = newX; }
    void setY(double newY) { y = newY; }

};

void main() {
    Coordinate2D myCoordinate();
    myCoordinate.setX(2);
    myCoordinate.setY(3);
    cout << myCoordinate.getX();
    cout << myCoordinate.getY() ;

}
```

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Scenario Questions

- What will be the **exact** output of this program?
- Assuming that we have already included all the required libraries and namespaces

```
class Student{
    int id;
public:
    Student();
    int getID() const;
    void setID(int);
};

Student::Student(){id = 2;}

void Student::setID(int id) {
    id = id;
}
int Student::getID() {
    return id * 5;
}

void main () {
    Student s1();
    s1.setID(3);
    cout << s1.getID();
}
```

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Scenario Questions

- What will be the **exact** output of this program?
- Assuming that we have already included all the required libraries and namespaces

```
class Student{
    int id;
public:
    Student();
    int getID() const;
    void setID(int);
};

Student::Student(){id = 2;}

void Student::setID(int id) {
    this->id = id;
}
int Student::getID() {
    return id * 5;
}

void main () {
    Student s1();
    s1.setID(3);
    cout << s1.getID();
}
```

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Scenario Questions

- What will be the **exact** output of this program?
- Assuming that we have already included all the required libraries and namespaces

```
void main() {
    Employee e();
    Manager m();
}
```

```
class Employee {
    int EmployeeID;
public:
    Employee();
    Employee(int);
};

Employee::Employee(int i) {
    cout << "ABC" ;
}
```

```
class Manager : public Employee {
    int Salary;
public:
    Manager();
    Manager(int);
};

Manager::Manager()
{
    cout << "ACD" << endl;
}
```

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Scenario Questions

- What will be the **exact** output of this program?
- Assuming that we have already included all the required libraries and namespaces

```
void main() {
    Bird sparrow(2,3);
}
```

```
class Animal {
    int LegLength;
public:
    Animal();
    Animal(int);
};

Animal::Animal(int l) {
    cout << "Animal" << endl;
}
```

```
class Bird : public Animal {
    Wing w1;
    Wing w2;
public:
    Bird();
    Bird(int, int);
};

Bird::Bird(int t1, int l1): Animal(l1), t(t1)
{
    cout << "Bird" << endl;
}
```

```
class Wing {
    int length;
public:
    Wing();
    Wing(int l);
};

Wing::Wing(int l):length(l)
{
    cout << "Wing" << endl;
}
```

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Scenario Questions

- What will be the **exact** output of this program?
- Assuming that we have already included all the required libraries and namespaces

```
void main() {
    Bird sparrow(2,3);
}
```

```
class Animal {
    Leg leg1;
public:
    Animal();
    Animal(int);
};

Animal::Animal(int l):leg1(l) {
    cout << "Animal" << endl;
}
```

```
class Leg {
    int length;
public:
    Leg();
    Leg(int l);
};

Leg::Leg(int l):length(l) {
    cout << "Leg" << endl;
}
```

```
class Bird : public Animal {
    Wing w1;
    Wing w2;
public:
    Bird();
    Bird(int, int);
};

Bird::Bird(int t1, int l1): Animal(l1), t(t1)
{
    cout << "Bird" << endl;
}
```

```
class Wing{
    int length;
public:
    Wing();
    Wing(int l);
};

Wing::Wing(int l):length(l)
{
    cout << "Wing" << endl;
}
```

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Light Programming Questions

- Define a Class named Graph
- The class should have a set of vertices and edges as described below
 - A vertex is a point with two coordinates (x and y)
 - An edge is a set of two points between which an edge exists
- Use appropriate datatypes and access types
- No need to declare or implement any functions

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Light Programming Questions

- Define a Class named Glass
- The class should have following member variables
 - Weight
 - Size
 - Price
- Use appropriate datatypes and access types
- Implement getter and setter functions for all the member variables

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Light Programming Questions

- **Design a class diagram** for a real estate company with following specifications.
 - There can be different types of properties, i.e., houses, apartments and offices.
 - All the properties will have attributes like id, name and price
 - Houses will have additional attributes like number of garages
 - Apartments will have additional attributes like floor number
 - Offices will have additional attributes like name of business district
- Draw (detailed) class diagram only. No need to write code

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Light Programming Questions

- **Extend the design of the class diagram** for a real estate company (in the previous question) with following specifications.
 - All properties can have customers as persons
 - Offices can have customers as companies
 - Customers can have attributes like id and name
 - Companies can also have attributes like id and name
- Draw (detailed) class diagram only. No need to write code

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Light Programming Question

- Write code (one line for each) to demonstrate following:
 1. How to declare a pointer
 2. How to initialize a pointer
 3. How to deallocate a pointer

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Light Programming Question

- Assume that there is a class Employee with attributes ID and Name. Write code to demonstrate following:
 1. How to use `this` pointer to get values of member variables
 2. How to use `this` pointer to set values of member variables

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More questions and variations of the practice questions to be discussed during lecture.

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No worksheet this week!

Mid-Term Exam

Date: Friday, 3rd March 2017

Location: AP236 (students with formal approval from PMC should already have received directions from PMC)

Start: 11:35 am

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References

- Dr. Audrey Girouard's Lecture Notes on BIT 2400 course
- Book "The Waite Group's object-oriented programming in C++"
 - Authors: Lafore, Robert
 - ISBN: 157169160X, 9781571691606
- Tutorial on Object Oriented Programming using C++
 - https://www.tutorialspoint.com/cplusplus/cpp_object_oriented.htm

Students are strongly recommended to practice as many examples as possible that can be found in lectures, tutorials/labs, recommended book or tutorials.

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Questions?

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