



UNIVERSITY OF ENERGY AND NATURAL RESOURCES, SUNYANI, GHANA
SCHOOL OF SCIENCES
DEPARTMENT OF COMPUTER ELECTRICAL AND COMPUTER ENGINEERING

LEVEL 300 MID SEMESTER EXAMINATIONS 2017/2018
Bachelor of Science (Computer Engineering)
CENG301: OBJECT ORIENTED PROGRAMMING

December, 2017

Instructions

Answer all questions in Section A, and two (2) questions in Section B.

Time: 1 Hour

SECTION A

1 x 20 = 20 Marks

1. Which of the following is a mechanism by which object acquires the properties of another object?

- a) Encapsulation
- b) Abstraction
- c) Inheritance
- ☒ d) Polymorphism

2. What will be the output of following program?

```
#include<iostream.h>
void main()
{
float x;
x=(float)9/2;
cout<<x;
}
```

- a) 4.5
- ☒ b) 4.0
- c) 4
- d) 5

3. The term _____ means the ability to take many forms.

- a) Inheritance
- b) Polymorphism
- ☒ c) Member function
- d) Encapsulation

4. Access to private data

- a) Restricted to methods of the same class
- ☒ b) Restricted to methods of other classes
- c) Available to methods of the same class and other classes
- d) Not an issue because the program will not compile

5. A static data member is given a value

- a) Within the class definition
- ☒ b) Outside the class definition

- c) When the program is executed
- d) Never

6. What will be the result of the expression 13 & 25?

- a) 38
- b) 25
- ☒ c) 9
- d) 12

7. In a class specifier, data or function designated private are accessible

- a) To any function in the program
- b) Only if you the password
- ☒ c) To member functions of that class
- d) Only to public members of the class

8. Which of the statements are true ?

- I. Function overloading is done at compile time.
- II. Protected members are accessible to the member of derived class.
- III. A derived class inherits constructors and destructors.
- IV. A friend function can be called like a normal function.
- V. Nested class is a derived class.

- a) I, II, III
- b) II, III, V
- c) III, IV, V
- ☒ d) I, II, IV

9. At which point of time a variable comes into existence in memory is determined by its

- ☒ a) Scope
- b) Storage class
- c) Data type
- d) All of the above

Speed 80 x 2 = 60
fully loaded 25 x 1 = 25
28 x 1 = 28
Babique 27 x 1 = 27
meat sausage
~~208~~

85
28
113
27
140

10. When the compiler cannot differentiate between two overloaded constructors, they are called

- a) Overloaded
- b) Destructed
- c) Ambiguous
- d) Dubious

11. Which of the following is the valid class declaration header for the derived class d with base classes b1 and b2?

- a) class d : public b1, public b2
- b) class d : class b1, class b2
- c) class d : public b1, b2
- d) class d : b1, b2

12. Which of the following operator can be overloaded through friend function?

- a) \rightarrow
- b) $=$
- c) $()$
- d) $*$

13. The mechanism that binds code and data together and keeps them secure from outside world is known as

- Abstraction
- Inheritance
- Encapsulation
- Polymorphism

14. The operator $<<$ when overloaded in a class must be a member function

must be a non member function
can be both (A) & (B) above
cannot be overloaded

15. To access the public function fbase() in the base class statement in a derived class function fder() uses the statement.fbase();

```
fbase();  
fder();  
base::fbase();  
der::fder();
```

16. A location in the computer memory that enables to temporary hold data when our program is executing is known as.....

17. Correcting errors in a computer program is typically known as

18. The type of error in a computer program that results in invalid results or answers generated by the computer is known as

19. is a concept of OOP which means exposing only necessary data.

20. provides facility of using object of one class inside another class.

SECTION B

Answer all questions

QUESTION 1

a) What is a Class?

[2 Marks]

b) A programmer designed a class called arith in order to use it to perform common arithmetic operation. The design is illustrated below

```
class arith{  
public:  
    double a,b;  
public:  
    arith(){a=0;b=0;}  
    void setA(int x){a=x;}  
    void setA(float x){a=x;}  
    void setA(double x){a=x;}  
    void setB(int y){b=y;}  
    void setB(float y){b=y;}  
    void setB(double y){b=y;}  
    double add(){return a+b;}  
    double div(){return a/b;}  
    double mul(){return a*b;}  
    double sub(){return a-b;}  
}
```

declared as a collection of data members along with member fn which allows association of data and functions into a single unit called encapsulation.

- Write a method that will accept two arguments or parameter which can be used to update attribute a and b in the above class. [2 Marks]
- illustrate how you can rewrite your method to exhibit the characteristics of polymorphism [4 Marks]
- When string data is passed to both SetA and SetB, it will result in an error. Write another forms of (SetA and SetB) that can accept the string value(s), but displays "invalid data " and assigns zero to the attributes of the object. [4 Marks]
- The div method may generate a run-time error when a user enters 0 for b, that is division by zero. Redesign the div method using the try-catch structure to prevent this from happening and also display the type of error that occurred [4 Marks]

c) An array is declared as float Amount[11]. The figure below illustrates the content of the array.

50.0	10.5	15.0	11.0	2.5	3.0	8.9	1.1	1.1	10.0	10.0
------	------	------	------	-----	-----	-----	-----	-----	------	------

$$50.0 + 10.5 + 1.1 + 15.0 + 8.9 + 2.5 = 87.5$$

```
int main(){
    float Amount[]={50.0, 10.5, 15.0, 11.0, 2.5, 3.0, 8.9, 1.1, 1.1, 10.0, 10.0};
    float D=0;
    string txtMsg = "";
    int I, J, K, L;
    J = -2;
    K = 10;
    L = 0;
    for(I=K; I>=L; I=I+J){
        //txtMsg = txtMsg + (Amount[I]);
        D=D+Amount[I];
    }
    cout<<D;
    return 0;
}
```

- Determine the content of txtMsg after the execution of the above codes
- What will be displayed after the line cout<<D has been executed

Empty string. [2 Marks]
[2 Marks]

$$50.0 + 10.5 + 15.0 + 8.9 + 2.5 + 1.1 = 87.5$$

QUESTION 2

Write a class for the implementation of a stack using an array as the main structure to hold members of the stack. Implement push, pop, peek, sizeof, and clearall as methods of the class. Again implement constructor overloading in your class. [20 Marks]

c.b display $\rightarrow [15.0, 11.0, 12.5, 3.0, 8.9, 1.1, 1.1, 10.0]$
c.a $txtMsg = txtMsg + (Amount[I])$
 $txtMsg = [15.0]$

arith::
void

i void arith:: set AB (double a1, double b1) {
 a = a1;
 b = b1;
}

ii class another_arith: public arith {
public:
 void set AB (double a1, double b1);
}
void another_arith:: set AB (double a1, double b1) {
 a = a1;
 b = b1;
}

iii void arith:: Set A (float x) {

try {
 a = x;
} catch (const std::exception & ex) {
 cout << "Invalid data";
 a = 0;
}

void arith:: set B (float x) {

try {
 b = x;
} catch (const std::exception & ex) {
 cout << "Invalid data";
 b = 0;
}