



College of Engineering Science and Technology

School of Electrical and Electronic Engineering

EEE525 – Engineering Software

Final Examination Semester 2, 2013

Instructions

Read the following instructions before writing

1. Time Allowed: 3 hours with additional 10 minutes reading time.
 2. All answers are to be written in the Question paper itself.
 3. Write your **student details** on the space provided below.
 4. There are Nine (9) main questions, some of which may have sub parts.
 5. Note that you have three appendices attached.
 6. ALL QUESTIONS ARE COMPULSORY.
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STUDENT ID NUMBER

GROUP

Question TWO

Discuss the relationship between *encapsulation* and *information hiding* as they pertain to Object Oriented Programming (OOP)

Make sure that your discussion contains enough details to illustrate the technically correct relationship. **(6Marks)**

Question THREE

Study carefully the fragment of code given in Appendix ONE. The output is also given.

After studying the code answer the question below in the space provided.

- a] In the space provided below, write down a brief description of the class that is being created. Include the name the *data members* and the *member functions*, and any other items, as they are defined in the class. Make sure you include your real world interpretation of the class. **(5 Marks)**

- b] Re-write on the space provided below the header of the Constructor *function* as it appears in the program **(2 Marks)**

- c) Study the constructor header you have written in above and in the space provided below write down what the corresponding *destructor* function would look like. **(3 Marks)**

- d) Give a full description of the function *addreal* , as it appears in the program. Make sure not to leave out any important information about it and also mention how it is being used in the program. **(5 Marks)**

- e) Discuss the similarities between a function in the *friend's list* and one that is declared *public*. **(4 Marks)**

f] Study the bit of code that appears in the main function. Discuss why it was necessary to create a third object c (4 Marks)

Question FOUR

Study carefully the fragment of code given in Appendix TWO.

After studying the code answer the question below in the space provided.

Discuss how inheritance, as an object oriented programming idea, is implemented in the code fragment that you have been asked to study.

Your response should include details about the following: -

- Classes and subclasses
- What is being inherited
- Key notations that depict inheritance

Make use of the various comments, provided as part of the program documentation, in the code fragment, to help you visualize and understand what the general problem is all about.

Draw neat and well-labeled UML standard diagrams to help your explanation. **(10 Marks)**

Question FIVE

The following terms are keywords in *C++* and constitute key ideas in other programming languages: -

Discuss each of them

a] Private (3 Marks)

b] Public (3 Marks)

c] Protected (3 Marks)

d] The scope resolution operator (3 Marks)

Question SIX

Study the *function declaration* given below: -

```
void operator = (Date&); //define assignment of a date
```

Also study the corresponding *function implementation* given below: -

```
void Date::operator = (Date& newdate) // (β)  
{  
    day = newdate.day; //assign the day  
    month = newdate.month; //assign the month  
    year = newdate.year; //assign the year  
    return;  
}
```

- a] Discuss what you can deduce from analyzing the function declaration.
This is the line commented with the symbol β (4 Marks)

- b] Discuss the significance of each of the three (3) lines of code found in the implementation section of the function. (8 Marks)

Question SEVEN

Overriding a base member function by using an overloaded derived member function is an example of polymorphism.

The above statement has been copied, in parts, from a text book.

Write down, using your own words and using your own examples, your own definition, of what polymorphism is, when used as an object oriented programming (OOP) subject.

Your discussion should include how the OOP issues of *overloaded functions* and *overriding operators* are linked to *polymorphism*. **(6 Marks)**

Question EIGHT

Study carefully the fragment of code given in Appendix THREE. The output is also given.

After studying the code answer the question below in the space provided.

- a] Write down, in the space provided below, the line which indicates that the *Box* class is derived from the *Rectangle* class. **(2 Marks)**

b] Describe in details what the function *calval()* every time it appears.

Your response should also include how it can be used under different circumstances. (5 Marks)

c] In the *main* function, locate the line: -

```
R1_ = B_1;
```

Describe what the line entails and the special circumstance that allows that assignment to work in the program. (5 Marks)

Question NINE

Using your own words , your own examples and with sufficient details discuss the following terms as they pertain to OOP.

Use the spaces provided.

a] *Mutator* functions (3 Marks)

b] *Accessor* functions (3 Marks)

(THE END)