FNÜ FIJI NATIONAL UNIVERSITY

College of Engineering Science and Technology

BEN507 – Introduction to Programming

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 Ten (10) main questions, some of which may have sub parts.

5. ALL QUESTIONS ARE COMPULSORY.

STUDENT ID NUMBER

GROUP

2013

Instructions

- Read the questions carefully and answer them directly in the spaces provided.
- The amount of details in your response will determine the amount of marks you get.
- Your response must be neatly written in correct well constructed English sentences.
- Well-labeled, and neatly drawn, diagrams are acceptable.
- Most questions have a leading statement *(italics)*. The statements are intended to provide context.

Question ONE

a]   *Most computer sales advertisements never fail to mention the speed of the computer's processor speed and the corresponding main memory.*

Discuss the special relationship between *main memory* and the *processor*.

Be sure to include the main ideas behind the von-Neumann architecture.   (4Marks)

b]   Discuss, using your own experience, how drawing a structure chart, as part of your preparation to coding, has helped you with your programming activities.   (4 Marks)

Question TWO

In the space provided below draw a truth table to depict all possible values of the following
expression: - **(B OR C) AND (NOT(A) OR A)**   **(7 Marks)**

Note: - Try to be efficient.

Question THREE

Determine the value of *Truth* in the following expression.

Truth = ((3== 5) || (5/3 < 2)) && !(2>6);

Assume that this was part of C++ code fragment and make sure you show all your workings.

(5Marks)

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Question FOUR

a]   One of the topics we have in our unit descriptor is *iteration*. This is also known as repetition or looping.

Discuss why it is important in programming.

Make sure to include your own experience as part of your response.   **(5 Marks)**

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b] Study very carefully the code fragment given below.

It shows a *nested for* loop

```
int count  = 0;

for (int k=-1; k<3; k++)

{

        for (int j=3; j>0; j--)

        {

                count++;

        }

}
```

In the space provided write down what the output should be (*Desk-check*).

Simply write your response in such a way that it will help us keep track of each variable's value throughout the program

Make sure you get the correct final value of the variable *count*.　　'(10 Marks)

Question FIVE

Using the equality operator *(==) when testing floating-point or double-precision operands can be problematic.*

Kakoo, using C++, wants to use the *logical* expression below as a part of her selection code: -

fnum == 0.011

The variable *fnum* is of *double* type.

(a) Explain why that expression is not safe when used as she intends to use it.

(4 Marks)

(b) Write down the expression he should use instead. (Hint:- EPSILON is 0.00005)

(4Marks)

Question SIX

a] *Functions can be declared to all calling functions by means of a function **prototype**.*

In your own words, and with a good example, give a good description about the essence of the above mentioned *prototype*. Make sure you give a good example that you may have used. **(4 Marks)**

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b] *We have discussed and actually implemented our own functions as part of our teaching and learning activities.*

Discuss your own experience with creating and implementing *functions*

Note especially how the idea of a *function* relates to the programming ideas of *abstraction* and *modularity*. **6 Marks)**

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c] *Everything in C++ is a function*

Like the *main()*function, every C++ function consists of two parts.

Discuss, to some details, making sure you give examples, what the two above mentioned parts are.   **(4 Marks)**

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d)   Our main program has this general form: -

int main() {

}

The last line that goes inside the braces ({}) is: -

return 0;

Explain the significance of the line above (return 0;) as it is used as part of main.
                                                                (4 Marks)

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Question SEVEN

Differentiate between *pass by value* and *pass by reference* when dealing with functions that require arguments in order to be properly invoked.

Your discussion should include well labeled diagrams and make sure you give good examples.   **(8 Marks)**

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Question EIGHT

The program below is written to find the biggest number in an array.

Study it carefully and answer the questions that follow:-

```cpp
#include<iostream>

using namespace std;

int main()

{

  const int MAXELS = 5;

  int i,max,nums[MAXELS]={2,18,1,27,16};

  max = nums[0];

  for(i = 1; i < MAXELS; i++)

        if(max < nums[i])

          max = nums[i];

  cout <<"The maximum value is" << max << endl;

  return 0;
```

a]   Write down the name of the array as it appears in the program   **(3 Marks)**

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b]   Write down that which identifies the total number of elements (indexes). **(3 Marks)**

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c] Write down the biggest index of the array. **(3 Marks)**

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d] Explain very carefully how the program gets to achieve its objective. You basically have to explain each line giving meanings to each of the main terms(identifiers/tokens) that are used. **(6 Marks)**

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Question NINE

a] *Classes* and *Objects* are the basic starting blocks in *Object Oriented Programming* (OOP).

In your own words, discuss the relationship between a *class*, and the *objects* that may belong to the class.

Make sure you use good examples, especially those from the learning activities that you carried out through the semester.   **(4 Marks)**

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b]   Read the body of text given below and answer the questions that follow: -

Imagine that you are managing a shop that sells resistors. Resistors have nominal values, tolerance values and colour codes. These are normally referred to as the attributes of a particular resistor.

As the manager you are also interested in the two functions of setting up these values and displaying them.

In the spaces provided below, draw a class and an object diagram that would help you create a class called *Resistor* and two corresponding objects namely *Resistor1* and *Resistor2*.

The diagram should enable you to go on and create the required class (Resistor) and the two corresponding objects (Reasistor1 and Resistor2) using an Integrated Development Environment (IDE) that supports Object Oriented Programming (OOP)

Remember to use UML conventions that you have read about practised. **(6 Marks)**

Question TEN

A pointer is a variable used to store the address of another variable.

Consider the variable declaration given below: -

float   MyFloat;

Discuss, with the help of a diagram, what it would be like, to get a pointer variable *FloatPointer*, that is a pointer to *MyFloat.*   **(6 Marks)**

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(THE END)