UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2010/2011

COURSE NAME	:	COMPUTER PROGRAMMING
COURSE CODE	:	BEC 10102 / BEE 1212
PROGRAMME	:	1 BEB/BEC/BED/BEF/BEH/BEU/BEE
EXAMINATION DATE	:	NOVEMBER/DECEMBER 2010
DURATION	:	2 HOURS 30 MINUTES
INSTRUCTION	:	ANSWER **FIVE (5)** QUESTIONS ONLY.

THIS PAPER CONSISTS OF SIX (6) PAGES

Instruction: Answer FIVE questions only. (50 MARKS)

Q1 Based on the following output from testing and verification phase of a C++ program which able to count and display the number of students' gender (male or female):

1st Test:

Enter number of students: 5
Enter gender of student male (M) or female (F): M
Enter gender of student male (M) or female (F): M
Enter gender of student male (M) or female (F): F
Enter gender of student male (M) or female (F): M
Enter gender of student male (M) or female (F): F
The number of male student is 3
The number of female student is 2
Press any key to continue

2nd Test:
Enter number of students: 0
The number of male student is 0
The number of female student is 0
Press any key to continue

3rd Test:
Enter number of students: -5
The number of male student is 0
The number of female student is 0
Press any key to continue

4th Test:
Enter number of students: 3
Enter gender of student male (M) or female (F): M
Enter gender of student male (M) or female (F): F
Enter gender of student male (M) or female (F): Z

WRONG GENDER! INCORRECT COUNTING

The number of male student is 1
The number of female student is 1
Press any key to continue

(a) Analyse the control structure by giving its condition statements.

(3 marks)

(b) Illustrate the algorithm using flowchart.

(7 marks)

Q2 (a) Convert the following C++ program using *if-else* statement.

```
#include<iostream>
void main (void) {

int option;

cout << "Please type 1, 2, or 3" << endl;
cout << "1. Breakfast" << endl;
cout << "2. Lunch" << endl;
cout << "3. Dinner" << endl;
cin >> option;

switch (option) {
        case 1: cout << "Good morning\n";
                cout << "Order breakfast\n";
                break;
        case 2: cout << "Order lunch\n";
                break;
        case 3: cout << "Order dinner\n";
                break;
        default:
                cout << "Order nothing\n";
}

}
```

(5 marks)

(b) Translate the following pseudocode into C++ using *for* loop.

```
Loop four times
        Calculate horizleg = 5 + (n – 1)
        Calculate vertleg = 7 / 2^(n-1)
        Calculate area = ½ x horizleg x vertleg
        Print "Triangle area number :" area
```

(5 marks)

Q3 (a) By using a diagram, explain the differences between the following two arrays.

```
char s1[] = {'a', 'b', 'c'};
char s2[] = "abc";
```

(6 marks)

(b) The following C++ program contains several errors.

```
#include<iostream>
using namespace std;

void main()
{
    char addr[]= "UTHM";
    char state[]="Johor";
    char s3[5];
    int i=0;

    cout<<strcpy(s3[i],strcat(addr[i],state[i]))<<endl;

    return;
}
```

(i) Rewrite the above program so that the program is free from errors.

(3 marks)

(ii) Predict the program output after b(i) is executed.

(1 mark)

Q4 Construct a C++ program that prompts the user to enter *n* numbers, and displays the standard deviation of numbers. Use eq.(1) and eq.(2) to find the standard deviation of numbers.

$$\text{mean}=\frac{\sum_{i=1}^{n} x_i}{n}=\frac{x_1+x_2+\ldots+x_n}{n} \qquad \text{eq.(1)}$$

$$\text{deviation}=\sqrt{\frac{\sum_{i=1}^{n}(x_i-mean)^2}{n-1}} \qquad \text{e.q.(2)}$$

(10 marks)

Q5 Answer Q5(a) to Q5(c) based on the following source code :

```
Line 1    #include <iostream>
Line 2    #include <fstream>
Line 3    using namespace std;
Line 4
Line 5    void duplicate(int* a, int* b) {
Line 6      (*a) = 2 * (*a);
Line 7      (*b) = 2 * (*b);
Line 8    }
Line 9
Line 10   void main( ) {
Line 11     int m =2, n=4;
Line 12     ofstream myfile;
Line 13     myfile.open("mydata.txt");
Line 14
Line 15     myfile<<"Value before duplicate " <<m <<" and " <<n <<endl;
Line 16     duplicate(&m,&n);
Line 17     myfile<<"Value after duplicate "<<m <<" and " <<n <<endl;
Line 18     close(myfile);
Line 19   }
```

(a) Determine the content of file *mydata.txt* after the execution of above program.

(3 marks)

(b) State the specific line that instructs the program to:

(i) use standard library header for creating an input or output stream.

(½ marks)

(ii) create a file and write data to it

(½ marks)

(c) Complete this graphical memory representation to show the pointers' activities in Q5 (a).

Before function call	After function call
m ☐	m ☐ a ☐
n ☐	n ☐ b ☐

(3 marks)

(d) Propose C++ code fragment to define the structure named *device*, containing the character array *deviceName[10]*, the integer *year_of_purchase*, and a structure variable *dv* of type array with size 5.

(3 marks)

Q6 (a) Given the following C++ source code. Briefly explain the program statements in Line 8 and Line 14. Then, provide the possible content of the output file.

```
Line 1    #include <iostream>
Line 2    #include <fstream>
Line 3    using namespace std;
Line 4
Line 5    void main()
Line 6    {
Line 7    ofstream outfile;
Line 8    outfile.open("message.text", ios::out);
Line 9
Line 10   if (!outfile){          //check if the file is opened or not
Line 11                  cout<<"\n Cannot open this file";
Line 12              }
Line 13   outfile <<"If you have registered for BEC 10102 course"<<endl;
Line 14   outfile <<"you must attend lectures not less than 80%"<<endl;
Line 15   outfile <<"of the contact hours,\notherwise you will not";
Line 16   outfile <<" be allowed to sit for this final exam";
Line 17
Line 18   outfile.close();//close the file
Line 19   }
```

(5 marks)

(b) A program for keeping track of students' records might use the following collection of members:

```
struct StudentRecord {
        char name[20];          // student name
        double testMarks[2];    // test marks
        double *mx, avg;        // pointer to testMarks and average of test
                                // marks
}std;

struct StudentRecord std;
std.mx = stdtestMarks;
```

Based on the above code snippets, write C++ statement to:

(i) assign "Alina" as std's *name*, 78 to the first element for *testMarks*, and 86 to the second element of *testMarks*.

(3 marks)

(ii) compute the average, *avg* based on pointer variable *mx*.

(2 marks)