



INTI

INTERNATIONAL COLLEGE PENANG (507232-U)
LAUREATE INTERNATIONAL UNIVERSITIES

**FINAL Examination Paper
(COVER PAGE)**

INTI LIBRARY
INTI INTERNATIONAL COLLEGE PENANG

Session : AUG 2012

Programme : DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING

Course : CSC1183: PROGRAMMING IN C++

Date of Examination : 10 December 2012

Time : 11a.m. – 1p.m. Reading Time : Nil

Duration : 2 Hours

Special Instructions :

This paper consists of SIX (6) questions. Answer any FOUR (4) questions in the answer booklet provided. All questions carry equal marks.

Materials permitted :

Nil

Materials provided :

Examiner(s) : Chern Huey Rong

Moderator : Annida Said

This paper consists of 8 printed pages, including the cover page.

DIPLOMA IN ENGINEERING

CSC1183: PROGRAMMING IN C++

FINAL EXAMINATION: AUG 2012 SESSION



Instructions: This paper consists of **SIX (6)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Question 1

- (a) Write a program which the user inputs a numeric value. If the input is even, the program will display all the even numbers from 1 until the input. If the number is odd, the program will display all the odd numbers from 1 until the input.

(6 marks)

- (b) Using a `switch` selection statements, write code fragments to display the following Game Menu:

```
Asteroid Game
1. New Game
2. Load Game
3. Save Game
4. Quit
Enter Choice (1-4):
```

If user enters any of the choices numbered 1 to 4, it will print a message:

```
You entered <number entered>
```

where `<number entered>` is the number the user typed.

(6 marks)

- (c) Write a program that asks the user to type an integer and writes "YOU WIN" if the value is between 56 and 78 (both included). In the other case it writes "YOU LOSE".

(7 marks)

- (d) Write a single C++ statement or line that accomplishes each of the following:
- Print the message "Enter two numbers".
 - Assign the product of variables `b` and `c` to variable `a`.
 - State that a program performs a sample payroll calculation (i.e., use text that helps to document a program.)
 - Input three integer values from the keyboard & assign into integer variables `a`, `b` and `c`.
 - If a boolean variable `isDone` is true, then exit the function.
 - Pass an integer array `n[10]` to a function called `fx()`

(6 marks)

Question 2

- (a) A Mindfulness Counter is a device that keeps count of the number of times a person becomes unaware of his surroundings and gets trapped in thoughts. Each time you catch yourself being lost in thought, you will enter a number 1 on the input of the screen. To end the program, enter a 0. The program will then print a report of the number of times you caught yourself getting lost in thought. Write the program that can do the above.

An example output is shown below:

```
Are you dreaming?
1
Are you dreaming?
1
Are you dreaming?
0
Number of times you got lost in thoughts: 2
```

INTI LIBRARY
INTI INTERNATIONAL COLLEGE PENANG

(6 marks)

- (b) Write a program that inputs 3 integers from the keyboard. Print the sum, average and product of these numbers.

(6 marks)

- (c) What, if anything, prints when each of the following C++ statements is performed? If nothing prints, then answer “nothing.”

Assume $x = 2$ and $y = 3$.

- (i) `cout << x;`
- (ii) `cout << x + x;`
- (iii) `cout << "x=";`
- (iv) `cout << "x = " << x;`
- (v) `cout << x + y << " = " << y + x;`
- (vi) `z = x + y;`
- (vii) `cout << y++;`
- (viii) `// cout << "x + y = " << x + y;`
- (ix) `cout << "\n";`
- (x) `cout << "x+y";`

(10 marks)

- (d) Explain the following code fragment which is usually included at the beginning of a program.

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

(3 marks)

INTI INTERNATIONAL COLLEGE PENANG LIBRARY

Question 3

- (a) Write a program that will randomly generate a number from 1 to 100. The user will then guess the number via several attempts. Each time the number is wrong, the program will let the user know if it is too high or too low, and the user will guess again. If the number guessed is correct, it will print "Correct", then quit the program. (7 marks)
- (b) Write a program that asks the user to type 10 integers of an array and an integer value V and an index value i between 0 and 9. The program will then put the value V at the place i in the array, shifting each element right and dropping off the last element. The program must then write the final array.

```

C:\WINDOWS\system32\cmd.exe
Enter the value to insert: 88
Enter index (0-9) in which to place the value: 5
Enter the 10 integer values:
array[0]: 2
array[1]: 4
array[2]: 6
array[3]: 8
array[4]: 10
array[5]: 12
array[6]: 14
array[7]: 16
array[8]: 18
array[9]: 20
New values of array are:
2
4
6
8
10
88
12
14
16
18

```

INTI LIBRARY
INTI INTERNATIONAL COLLEGE PENANG

(8 marks)

- (c) Base on code below, trace the output if code A is replaced by each piece of code in sub section below.

```

#include <iostream>

using std::cout;
using std::endl;

int main()
{
    char value[1000];
    strcpy(value, "Hello World!");

    char* ptr = value;

    CODE A

    return 0;
}

```

- i. `*ptr = 'P'; ptr=ptr+2; cout << ptr;`
- ii. `ptr=ptr+3; *ptr = '8'; ptr--; *ptr = '2'; cout << ptr;`
- iii. `*(ptr+1) = *(ptr+6); *(ptr+6) = *(ptr+1); ptr++; cout << ptr;`
- iv. `*(ptr++) = '5'; char* temp = ptr+1; *temp=*(ptr+7); cout << ptr;`
- v. `ptr = ptr + 5; char* temp = ptr - 2; *(temp--) = '8'; *(ptr+1) = '5'; cout << temp;`

(10 marks)

Question 4

- (a) An integer is said to be a perfect number if the sum of its factors, including 1 (but not the number itself), is equal to the number. For example 6 is a perfect number, because $6 = 1 + 2 + 3$. Write a function `perfect` that determines whether parameter `number` is a perfect number. Use this function in a program that determines and prints all the perfect numbers between 1 and 1000.

(8 marks)

- (b) Square root of a given integer, M can be determined by the following formula

$$x(n+1) = 1/2 * (x(n) + M/x(n))$$

when n approaching infinity, $x(n)$ is the square root of M . Write a function to compute square root of M using the above formula (to the precision of 4 decimal).

(8 marks)

- (c) Write the definition of a class named "computer" which includes the attribute "name" (the name of the computer) and a print method that prints out this name.

Also write the definition of a class named "Macintosh" that is derived from the class "computer" (computer is the base class) and includes the attribute "color" (a string) and a method named `print` that prints out the computer name and color.

Here is main function that will test these objects, it uses a pointer to treat a Macintosh object as a computer object, and calls the print method.

```
int main() {
    computer *p;
    Macintosh imac("Joe's IMAC", "Blue");

    p = &imac;

    p->print();
}
```

INTI LIBRARY
INTI INTERNATIONAL COLLEGE PENANG

I want the printout of this test program to be something like:

```
Name: Joe's IMAC
Color: Blue
```

(9 marks)

Question 5

(a) Explain terms below:

- i. encapsulation
- ii. destructor
- iii. default constructor
- iv. copy constructor
- v. virtual function
- vi. abstract class

(12 marks)

(b) Request a set of (x, y) coordinates and a name from user, then sort and display them in order increasing distance from the origin $(0, 0)$. Define struct to hold coordinates and name of each point. Define a function to calculate the distance from origin. Store the set of coordinates in an array of structure.

Formula for distance as shown below:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

(8 marks)

(c) Using break statements, write a program that will loop perpetually to continually input positive numbers from user and total them out and will only break out of the loop when user enters negative numbers. Once the program breaks out of the loop, it will display the total.

(5 marks)

INTI LIBRARY
INTI INTERNATIONAL COLLEGE PENANG

Question 6

- (a) (i) Create a class `Car` in a file called `Car.h` that has the following members:

Attributes: `make` (eg `Honda`), `year` (eg `2009`)

Methods: `setMake`, `getMake`, `setYear`, `getYear`

(3 marks)

- (ii) In another file called `Car.cpp`, create the implementation for the functions in Question 1 above. Your function should have input validation for year. If year is not within 1970 to 2009, show an error message to user. Ask user to re-enter.

(3 marks)

- (iii) Create an array of 20 cars of class `Car` as defined in Question (i) above.

(1 mark)

- (iv) Using a `for-loop`, loop through each of the array of cars above, and set the `make` and `year` from user input. Make sure you prompt user for input for the `make` and `year`. Create this in a function.

(3 marks)

- (v) Create a file called `car.dat` to store each of the array of cars above. Show the code of a function to create the file and also to write to the file.

(2 marks)

- (vi) Write a function to open the file `car.dat` above and read all the 20 car records and then to display all twenty cars. An example is as below:

Car	Make	Year
1	Honda	2007
2	Toyota	2008
....	etc....	

(3 marks)

- (b) Write a program that reads three nonzero values entered by the user and determines and prints whether they could represent the sides of a triangle.

(4 marks)

- (c) Write a program to input **TEN(10)** integers from the keyboard and store them in an array. Display the unsorted array onto the screen. Then, sort the array in ascending order and display the sorted arrays onto the screen.

(6 marks)

--THE END--

Csc1183(F)August 2012

INTI LIBRARY
INTI INTERNATIONAL COLLEGE PENANG