UNIVERSITI TEKNOLOGI MARA
TEST 2

COURSE	**:**	**FUNDAMENTALS OF COMPUTER PROBLEM SOLVING**
COURSE CODE	**:**	**CSC128**
EXAMINATION	**:**	**SEPTEMBER 2014**
TIME	**:**	**1 ½ HOURS**

INSTRUCTIONS TO CANDIDATES

1. This paper consists of THREE(3) parts: PART A (10 Questions)
   PART B (4 Questions)
   PART C (1 Question)

2. Answer ALL questions from PART A, PART B and PART C in the question paper.

3. Do not bring any material into the examination room unless permission is given by the invigilator.

ANSWER SCHEME

MARKS	
Part A: (10 marks)	
Part B: Q1 (4 marks)	
Part B: Q2 (8 marks)	
Part B: Q3 (6 marks)	
Part B: Q4 (7 marks)	
Part C: (15 marks)	
TOTAL MARKS (50 MARKS)	

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This examination paper consists of 13 printed pages

PART A (10 MARKS)

1. Which of the following are the repetition structures in C++?

   i. sequential control structure
   ii. selection control structure
   iii. counter-controlled structure
   iv. sentinel-controlled structure

   A. i, ii
   B. iii, iv
   C. iv only
   D. I,ii, iii, and iv

2. How many times will the sentence "**MERDEKA**" be printed by the following program segment?

```
for (int m = 0; m < 7; m++)
{
  cout << “MERDEKA” << endl;
  m = m + 2;
}
```

   A. 3
   B. 4
   C. 7
   D. Infinite loop

3. Determine the output of the following program fragment:

```
int loop = 5;
if (loop != -5)
while (loop != -5)
{
   cout << -5 << " ";
   loop = loop - 5;
}
```

   A. -5
   B. -5 -5
   C. 5 -5
   D. 5 0 -5

4. Which of the following segment of codes result in **infinite** loop?

A.
```
for(intx=1;x<5;x++)
   cout<<”hello”;
```

B.
```
for(intx=0;x>5;x++)
   cout<<”hello”;
```

C.
```
for(intx=0;x<=5;x++)
   cout<< ”hello”;
```

D.
```
for(intx=1;x<=5;x--)
   cout<<”hello”;
```

5. What is displayed by the following program ?

```
for(int x = 1; x <= 3; x++)
  for(int y = x; y >= 1; y--)
    cout << y;
  cout << endl;
```

A.
```
1
12
123
```

B.
```
1
22
333
```

C.
```
1
21
321
```

D.
```
121321
```

6. **math.h** contains functions for _____

A. calculating the sum of integers
B. calculating the amount of circumference
C. calculating the square root
D. calculating the average of numbers

7. Which of the following is **TRUE** about function?

A. The actual parameters must include each parameter's data type and name.
B. The names of the formal parameters must be the same to the names of the actual arguments.
C. The data type of value parameters in the function call and reference parameters in the function header must be the same.
D. The function call of a void function should be a statement by itself, while the return function must be written in other statement.

8. What is the return type of function `try()` ?

```
int w; char x = 's'; float y = 2.0; double z = 3.0;
w = try(x,y,z);
```

A. `int`
B. `char`
C. `float`
D. `double`

9. Given the following function prototype :

```
float Symbol(char,int&);
```

Which of the following function call is **VALID** ?

A. `cout << Symbol(opcode,10) << endl;`
B. `ans = Symbol(char opcode,int& results);`
C. `ans = (Symbol(opcode,results) % 2) + 100;`
D. `Symbol(opcode,results);`

10. Determine the output of the following program segment.

```
int funOne(int a)
{
   return (a/5);
}

void main()
{
   int x = funOne(7/2);
   cout  << x;
}
```

A. `0.7`
B. `0`
C. `0.6`
D. `1`

PART B (25 MARKS)

QUESTION 1

Determine the output of the following program segments:

a)

```
int number, no, x = 0;

cin >> number;
while (number > 0)
{
  no = number % 10;
  number = number/10;
  cout << no;
  x += no;
}
cout << endl << x;
```

If the input is:

i) 7342

Answer: **2437**
16

b)

```
for (int x = 1; x <= 3; x++)
{
   for (int y = 1; y <= 4; y++)
      cout << x * y << " ";
   cout << endl;
}
```

Answer: **1 2 3 4**
2 4 6 8
3 6 9 12

(4 marks)

QUESTION 2

a) Write C++ statements to perform the following tasks:

i) Use **for** statement to display the multiplication of numbers entered by user. Assume that the first integer read specifies the number of values remaining to be entered. An example of the output screen is:

```
How many numbers to input? 5
3
1
10
5
4
The answer is 600
```

Answer:

```
void main()
{
    int no, num, mul = 1;

    cout << "How many numbers to input? ";
    cin  >> no;

    for (int x = 1; x <= no; x++)
    {
       cin >> num;
       mul = mul * num;
    }
    cout << "The answer is " << mul;
}
```

ii) Use **while** statement to allow user to enter test scores. The process will continue until user enter -1 to stop. The program will then display the highest score entered.

Answer:

```
void main()
{
   float scores, max = 0;

   cout << "Enter test scores (-1 to stop): ";
   cin  >> scores;
    while (scores != -1)
   {
      if (scores > max)
         max = scores;

       cout << "Enter test scores (-1 to stop): ";
       cin  >> scores;
   }
   cout << "The highest score is " << max;
}
```

(8 marks)

QUESTION 3

Function `func1()` will receive `n1` an integer value and input `n2` which is a float number. The function will return the result of the subtraction of `n1` minus `n2`. `func1()` will also return '**P'** if the result of the subtraction is positive, and return '**N'** if the result **i**s negative. Write function **definition** for function `func1()` based on the following function calls:

a) `func1(n1,result,type);`

Answer:

```
void func1(int n1, float& result, char& type)
{
   float n2;

   cout << "\nEnter a number: ";
   cin  >> n2;

   result = n1 - n2;

   if (result > 0)
      type = 'P';
   else
      type = 'N';
 }
```

b) `type = func1(n1,result);`

Answer:

```
char func1(int n1, float& result)
{
   float n2;  char type;

   cout << "\nEnter a number: ";
   cin  >> n2;

   result = n1 - n2;

   if (result > 0)
      type = 'P';
   else
      type = 'N';

   return type;
}
```

OR SIMPLIFY

```
if (result > 0)
   return 'P';
else
   return 'N';
```

(6 marks)

QUESTION 4

a) The function `swap()` below is intended to swap (exchange) the values of two integers.

```
void swap(int a, int b)
{
   a = b;
   b = a;
}
```

i) What is the output when the following statements are given in the main program?

```
int x = 7;
int y = 3;
swap(x,y);
cout << x << " " << y << endl;
```

Answer: 7 3

ii) Rewrite function `swap()`so that it will produce the intended output.

Answer:

```
void swap(int &a, int &b)
{
    int temp;

    temp = a;
    a = b;
    b = temp;
}
```

b) Given the following C++ program:

```
char function2(int x, int y)
{
   x = x % 3 * 10;
   y = x - y;
   return '#';
}

void function1(int k, int& s)
{
   s = 1;
   for (int n = 1; n <= 3; n++)
    s = s * k;
}

void main()
{
   int a = 2, b = 3, c = 4;

   function1(c, b);
   b = b * a;
   char H = function2(b,c);
   cout << "Remember to " << H << b;
}
```

i) Identify and give **ONE(1)** example for each of the following items:

a. Actual Parameter **Answer: b or c**

b. Value Parameter **Answer: x or y or k**

ii) State the output of the program.

Answer: Remember to #128

iii) What does `function1()` do?

Answer: calculate the cube of a number (calculate the number to the power of three)

(7 marks)

PART C (15 MARKS)

QUESTION 1

Write a complete C++ program using functions to calculate and display the total charge for each patient of Klinik Gigi AhSaKiet. The functions are:

a) Function **consult()** to input the **registration fee**, **consultation fee**, and **type of diagnostic** (D for dental treatment and S for surgery) and return the information through parameter.

b) Function **treatment()** to input **dental treatment code** and **no of tooth**; and return the **treatment charge**. The charge is based on the following table:

Code	Dental Treatment	Charge Per Tooth
A	Extraction	RM 15.00
B	Filling	RM 20.00
C	Crown	RM 40.00

c) Function **surgery()** to receive the **type of patient** and return the **charge for surgery**. The surgery charge for the outpatient is RM 1100.00 and for the inpatient is RM 800.00.

d) Function **display()** to receive and display the **type of patient**, **registration fee**; **consultation fee**; **treatment** and **surgery** charges.

e) A main program that will prompt the user to input **type of patient** (O for outpatient and I for inpatient), call all the functions needed (note: main() will call function **treatment()** if the type of diagnostic is D and call function **surgery()** if the type is S), and display the total charge. The process will continue until the user request to stop.

Below is an example of the output screen:

```
                KLINIK GIGI AHSAKIET

          Enter the following information:
               Type of Patient: O
               Registration Fee: RM 5.00
               Consultation Fee: RM 30.00
               Type of Diagnostic: D
               Dental Treatment Code: B
               No of tooth: 2
-----------------------------------------------
   BILL STATEMENT - KLINIK GIGI AHSAKIET

               Type of patient: Outpatient
               Registration Fee: RM 5.00
               Consultation Fee: RM 30.00
               Treatment Charge: RM 40.00
               Surgery Charge: RM 0.00
               TOTAL CHARGE => RM 75.00

               Another patient(Y|N)? N
```

Answer

a)

```
void consult(float &regFee, float &consultFee, char &diagnostic)
{
   cout << "\t\t\tRegistration Fee: RM ";
   cin  >> regFee;
   cout << "\t\t\tConsultation Fee: RM ";
   cin  >> consultFee;
   cout << "\t\t\tType of Diagnostic: ";
   cin  >> diagnostic;
}
```

b)

```
float treatment()
{
   float treatCharge;
   char dentalCode; int noOfTooth;

   cout << "\t\t\tDental Treatment Code: ";
   cin  >> dentalCode;
   cout << "\t\t\tNo of Tooth: ";
   cin  >> noOfTooth;

   if (toupper(dentalCode) == 'A')
      treatCharge = noOfTooth * 15;
   else if (toupper(dentalCode) == 'B')
      treatCharge = noOfTooth * 20;
   else if (toupper(dentalCode) == 'C')
      treatCharge = noOfTooth * 40;

   return treatCharge;
}
```

c)

```
float surgery(char typePatient)
{
   float surgeryCharge;

   if (toupper(typePatient) == 'O')
      surgeryCharge = 1100.00;
   else if (toupper(typePatient) == 'I')
      surgeryCharge = 800.00;

   return surgeryCharge;
}
```

d)

```
void display(char typePatient, float regFee, float consultFee, float
treatCharge, float surgeryCharge)
{
   cout << "\n\t     ------------------------------------------------";
   cout << "\n\t\t   BILL STATEMENT - KLINIK GIGI AHSAKIET";

   if (toupper(typePatient) == 'O')
      cout << "\n\n\t\t\tType of patient: Outpatient";
   else
      cout << "\n\n\t\t\tType of patient: Inpatient";

   cout << "\n\t\t\tRegistration Fee: RM " << regFee;
   cout << "\n\t\t\tConsultation Fee: RM " << consultFee;
   cout << "\n\t\t\tTreatment Charge: RM " << treatCharge;
   cout << "\n\t\t\tSurgery Charge: RM "   << surgeryCharge;
}
```

e)

```
#include <iostream.h>
#include <conio.h>
#include <ctype.h>
#include <iomanip.h>

void consult(float &, float &, char &);
float treatment();
float surgery(char);
void display(char, float, float, float, float);

void main()
{
  float treatCharge, surgeryCharge, regFee, consultFee, totalCharge;
  char diagnostic, typePatient;
  char answer = 'Y';

  cout << setiosflags(ios::fixed) << setprecision(2);  // not required

  while (toupper(answer) != 'N')
  {   clrscr(); // not required
      treatCharge = 0; surgeryCharge = 0;

      cout << "\n\t\t\t  KLINIK GIGI AHSAKIET";
      cout << "\n\n\t\t    Enter the following information:";
      cout << "\n\t\t\tType of Patient: ";
      cin  >> typePatient;

      consult(regFee, consultFee, diagnostic);

      if (toupper(diagnostic)== 'D')
         treatCharge = treatment();
      else if (toupper(diagnostic)== 'S')
         surgeryCharge = surgery(typePatient);
```

```
      display(typePatient, regFee, consultFee, treatCharge,surgeryCharge);

      totalCharge = regFee + consultFee + treatCharge + surgeryCharge;

      cout << "\n\t\t\tTOTAL CHARGE => RM " << totalCharge;

      cout << "\n\n\t\t\tAnother patient(Y|N)? ";
      cin  >> answer;
    }
}
```

END OF QUESTION PAPER