



UNIVERSITI TEKNOLOGI MALAYSIA

MID-TERM TEST (THEORY COMPONENT)

SEMESTER I 2016/2017

SUBJECT CODE : SCSJ1013
SUBJECT NAME : PROGRAMMING TECHNIQUE I
YEAR/COURSE : 1 (SCSJ / SCSV / SCSB / SCSR / SCSD)
TIME : 2:00 PM – 3:15 PM (75 MINUTES)
DATE : 8th NOVEMBER 2016
VENUE : N28 MPK1-MPK10

INSTRUCTIONS TO THE STUDENTS:

This test book consists of 10 questions.

ANSWER ALL QUESTIONS IN THIS BOOKLET IN THE SPACES PROVIDED.

Additional answer sheets will be given upon request.

Name	
I/C No.	
Year/Course	
Section	
Lecturer's Name	

This question booklet consists of **11 pages** inclusive of the cover page.

1. A prime number is a whole number greater than 1 that can only be divided evenly by 1 and itself. Below is a program that asks the user to enter a single digit integer. If the user enters a single digit that is prime (2, 3, 5, or 7), print “The digit is prime”. Otherwise, print “The digit is not prime”. Based on the same program, fill in the blank lines in the main function with appropriate instructions. **Figure 1** shows the example of the executed program. (3 marks)

```
#include <iostream>
using namespace std;
int main()
{
    int x; // the number entered by the user

    // (i). Read a number from the keyboard
    cout << "Enter a single digit integer: ";

    _____

    // (ii). Consider only the prime numbers to be selected
    if ( _____ )
        cout << "The digit is prime" << endl;
    else
        cout << "The digit is not prime" << endl;
    return 0;
}
```

Run 1

```
Enter a single digit integer: 3
The digit is prime
```

Run 2

```
Enter a single digit integer: 7
The digit is prime
```

Run 3

```
Enter a single digit integer: 9
The digit is not prime
```

Figure 1

2. Show the output of the following code with decimal points where applicable. (8 marks)

```
int x1, x2, i, j =1, k, y, z;
float f;  x1 = 1;  x2 = 1;
y = 5 + x1--;
z = 5 + ++x2;
i = 6 % 4;
j += j + 3;
k = 25 / 2;
f = static_cast<float>(2 / 5) * k;

cout << "x1 is " << x1 << endl;
cout << "x2 is " << x2 << endl;
cout << "i is " << i << endl;
cout << "j is " << j << endl;
cout << "k is " << k << endl;
cout << "y is " << y << endl;
cout << "z is " << z << endl;
cout << "f is " << f;
```

Answer:

3. Write the main function of a program that prompts the user to enter two points (**x1**, **y1**) and (**x2**, **y2**) and display their distances. The formula for computing the distance is $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$. You should use appropriate mathematical functions. The output from a sample run is given below.

(5 marks)

```
Enter x1 and y1: 1.5 -3.4
Enter x2 and y2: 4 5
The distance of the two points is 8.76413
```

Answer:

```
#include <iostream>
#include <cmath>
using namespace std;
int main()
{
```

```
    return 0;
}
```

4. You are given a description in order to create a C++ code. Provide a suitable C++ statement in the given column. (4 marks)

	Description	C++ Statement
i.	Determine if <code>count</code> is not greater than 20	
ii.	Determine if <code>count</code> is within the range of 0 through 100.	
iii.	Determine if <code>count</code> is outside the range of 0 through 100.	

5. You are given a description for constructing conditional statement. Complete the given column with an appropriate statement. (4.5 marks)

	Description	Conditional Statement
i.	Assign 0 to <code>z</code> if <code>a</code> is less than 10, otherwise it should assign 7 to <code>z</code> .	
ii.	Assign the result of <code>base x 10</code> to <code>population</code> if <code>temp</code> is greater than or equal to 45, otherwise it should be assigned with <code>base x 2</code> .	
iii.	Assign <code>max</code> with <code>n1</code> , if <code>n1</code> is greater than <code>n2</code> . Otherwise <code>max</code> will be assigned with <code>n2</code> .	

6. Determine the output of each code segment below (if any) for the given value of n .
Notes: Write the text "<NO OUTPUT>" If the code does not print anything.

(4.5 marks)

i.

```

if (n >=0)
    if (n<=10)
        cout << "Hello ";
    else
        cout << "Hi ";
        cout << "World ";

```

ii.

```

switch (n){
    case 3 : cout << "Welcome To ";
    case 2:  cout << "The World Of ";
    case 1:  break;
    case 0:  cout << "Computer Programming ";
}

```

iii.

```

cout << ( n%2==0 ?  n*10 : n + 10 );

```

Answers:

i.

n	Output
-1	
1	
11	

ii.

<i>n</i>	Output
0	
1	
3	

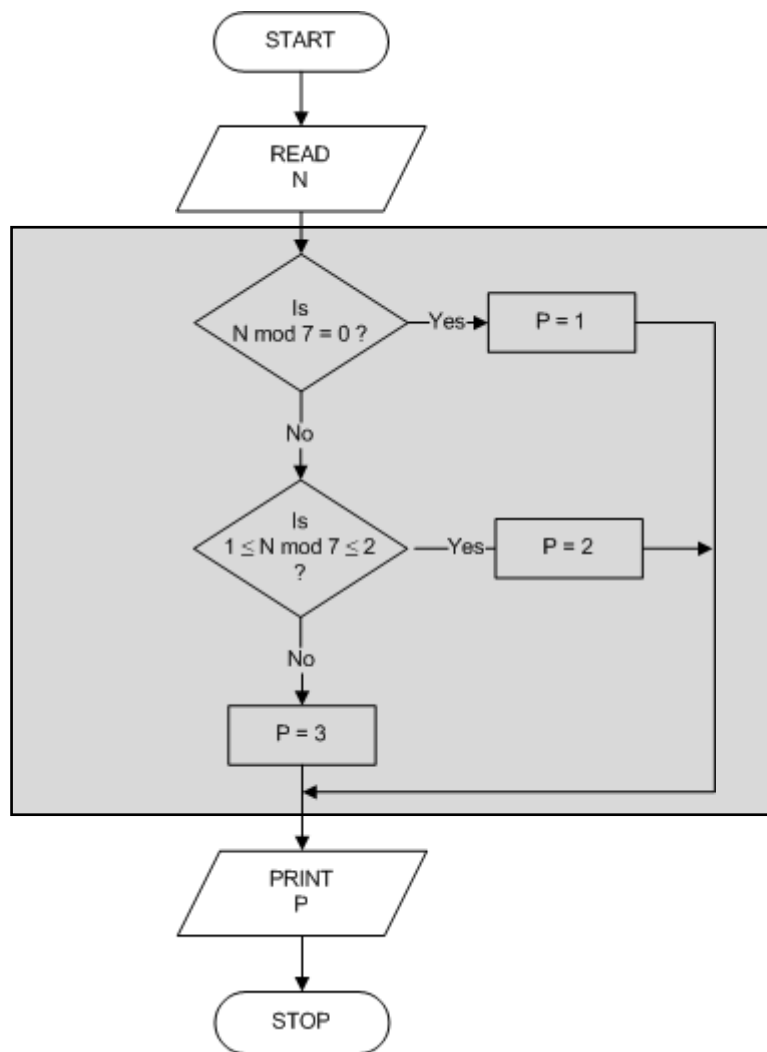
iii.

<i>n</i>	Output
1	
2	
3	

7. Given a flowchart in **Figure 2**. Write the code segment for the shaded part of the flowchart using:
- the `if` statement
 - the `switch` statement

Notes: Use a separate code segment for each question.

(9.5 marks)

**Figure 2****Answers:**

i.	
----	--

ii.	
-----	--

8. Determine the output for each code segment below:

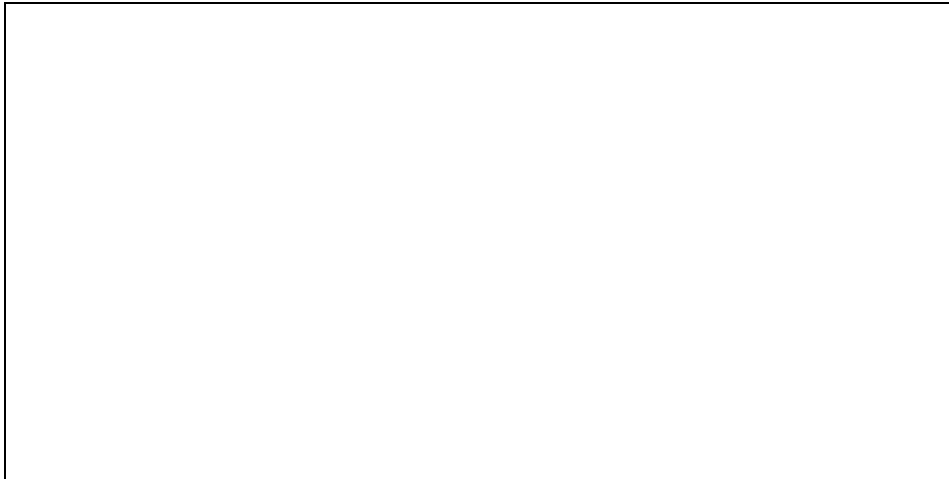
(6 marks)

i.	<pre> int n; for (n=110; n<200; n+=10){ if (n == 120 n==150) continue; cout << n << endl; if (n > 160) break; } cout << "The last value of n is " << n << endl; </pre>
ii.	<pre> for (int i=1; i<4; i++){ int j=i; while (j>0){ cout << "i=" << i <<" j=" << j<< endl; j--; } } </pre>

Answers:

	Output
i.	

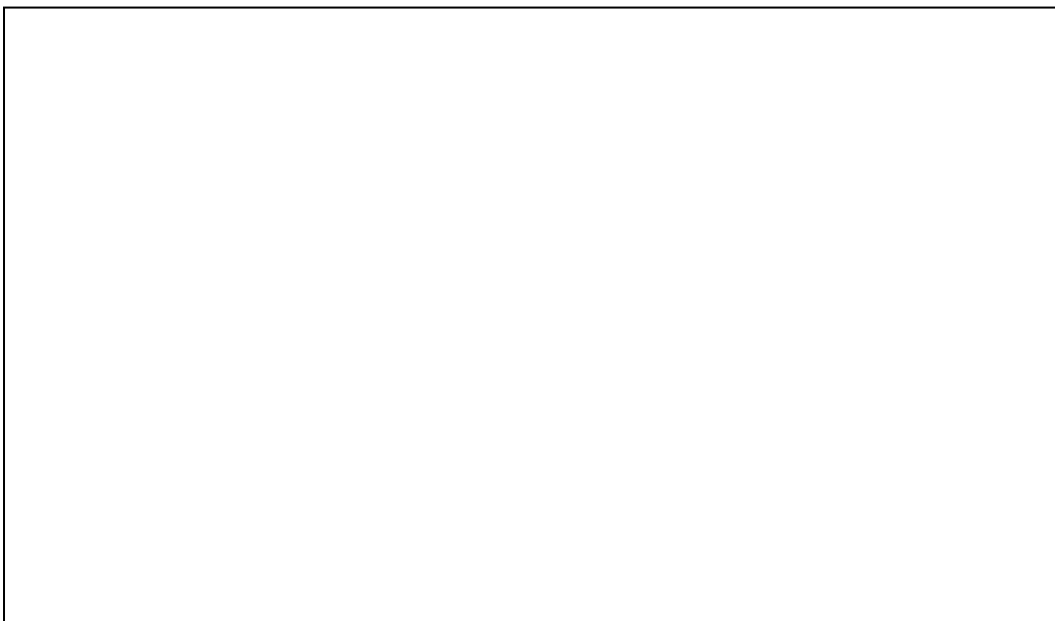
ii.



9. Rewrite the following code fragment so that it uses a `while` loop to accomplish the same task. (2 marks)

```
int n;  
do  
{  
    cout << "Enter a non-negative integer: ";  
    cin >> n;  
    if (n < 0)  
        cout << "The integer you entered is negative."  
<<endl;  
} while (n < 0);
```

Answer:



10. **Program A1** is intended to store the numbers entered by the user into an output file. Although the user can enter any numbers, the program only stores the positive ones. Besides the positive numbers, the program also stores the total of the numbers. The program terminates when the user enters a value of -999. **Figure 3** shows an example run of the program and the output file. Fill in the blank lines in the program with appropriate instructions. (3.5 marks)

Run:

```
Enter a number => 1
Enter a number => 5
Enter a number => -9
Enter a number => -8
Enter a number => 2
Enter a number => 0
Enter a number => 6
Enter a number => -999
```

Output file:

```
1
5
2
6
Total = 14
```

Figure 3

Answers:

```
//Program A1
#include<iostream>
#include<fstream>

using namespace std;

int main()
{
    int n;           // The number entered by the user
    int total;       // The total of the stored numbers
    ofstream fout;   // The handle for the output file

    fout.open("output.txt");
```

```
// (i). Initialize the variable total
_____

do{
    // (ii). Read a number from the keyboard
    cout <<"Enter a number => ";
    _____

    // (iii). Consider only positive numbers for writing into
    //         the output file and the calculation of the total.
    _____
    _____
    _____

}while(_____); // (iv). Terminate when the number is -999

// (v). Write the total into the output file.
_____

fout.close();
}
```