



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

SCHOOL OF COMPUTING
Faculty of Engineering

Semester I 2020/2021

SECJ1013-05 Programming Technique I

Assignment 3

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Date Submitted: 20 January 2021

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1. There are five operators shown in the expression as in the given figure. Label the order of execution for each operator in the boxes as stated in the expression. The operator that will be executed first should be labeled as 1, the second operator to be executed should be labeled as 2, and so on. Finally give the result of the expression according to this sequence of executions.

[3 marks]

z	=	(	12	+	4	)	/	4	+	30	/	3	-	3
				1			2		4		3		5	

Answer: 11

2. What is the output for the following statements marked (a) to (e). Write your answer in the space provided according to the sequence required.

[5 marks]

```
double val = 10.34567;

cout << setprecision(6) << val << endl; // (a)
cout << static_cast<int>(val)/2 << endl; // (b)
cout << "\t" << setprecision(3) << val << ", " ; // (c)
cout << setw(6) << val*5 << endl << endl; // (d)
cout << showpoint << fixed << setw(9) << val << endl; // (e)
```

Answer:

10.3457

5

10.3, 51.7

10.346

3. Refer to **Program A.1** below which is incomplete. As a result of the prompt on line 9, assume that the input string entered is "ABCDEFGH IJKLM". Write the corresponding output to be displayed for each of the corresponding codes in Code 1, Code 2 and Code 3 as given in the boxes after **Program 1**.

[7 marks]

<pre> 1 // Program 1 2 #include <iostream> 3 #include <iomanip> 4 using namespace std; 5 6 int main() 7 { 8 char x[13]; 9 cout << " Enter a string : "; 10 11 // either Code 1, 2 or 3 12 // will be placed here 13 14 return 0; 15 }</pre>	
Code 1: [2 marks] <pre> cin>>x; cout<<x<<endl;</pre>	Output: Enter a string : ABCDEFGHIJKL ABCDEFGH
Code 2: [2 marks] <pre> cin.getline(x,13); cout<<x<<endl;</pre>	Output: Enter a string : ABCDEFGHIJKL ABCDEFGH IJK
Code 3: [3 marks] <pre> cin>>x; cout<<setw(13)<<x<<endl;</pre>	Output: Enter a string : ABCDEFGHIJKL ABCDEFGH

4. The following C++ program, **Program 2** cannot be compiled. Rearrange the lines in the correct sequence in order for the program to be compiled and executed to produce the output as indicated.

[5 marks]

1	// Program 2
2	cout << "Success\n";
3	cout << " Success\n\n";
4	int main()
5	cout << "Success"; }
6	using namespace std;
7	#include <iostream>
8	cout << "Success\n";
9	{
10	return 0;

Program output :

Success
Success
Success Success

Use the table below to rearrange the lines based on the output given.

1	// Program 2
2	#include <iostream>
3	using namespace std;
4	int main()
5	{
6	cout << "Success\n";
7	cout << "Success\n\n";
8	cout << "Success";
9	cout << " Success\n";
10	return 0;}

5. Write the corresponding conditional expression for the following if else statements.

[12marks]

	if...else statement	Conditional expression
i.	<pre>if (score >= 50) { numPass++; cout<<"Pass"; } else { numFail++; cout<<"Please try again."; }</pre>	<pre>score = (score >= 50)? numPass++ cout<<"Pass" : numFail++ cout<<"Please try again." ;</pre>
ii.	<pre>if (cpa >= 2.0) { if (cpa >= 3.5) status = "Dean's List"; else status = "Normal Pass"; } else { if (cpa >= 1.7) status = "Probation"; else status = "Fail"; }</pre>	<pre>status = (cpa >= 2.0)? ((cpa >= 3.5)? status = "Dean's List" : status = "Normal Pass") : ((cpa >= 1.7)? status = "Probation" : status = "Fail");</pre>

6. Write C++ **if** statement code fragments to satisfy the given conditions. [10 marks]

i.	Check the range of frequency, freq to be between 100Hz and 10000Hz. Display "Acceptable" if within the range and "Unacceptable" if not. (3 marks)
	<pre>#include <iostream> using namespace std; int main() { int freq; // freq = frequency cout<<"This program is used to check whether the frequency is in the range or not.\n"; cout<<"Enter your frequency in Hz: "; cin>>freq; //get frequency from user cout<<"Your range which is "<<freq<<"Hz is "; if(freq>=100 && freq<=10000) { cout<<"Acceptable"; } else { cout<<"Unacceptable"; } return 0; }</pre>

ii.	Check the prerequisite for a soldier candidate to be of age between 18 to 30 years, weight between 50 to 65kg and height must be greater than 156m. Display "Fulfill requirements" or "Do not fulfill requirements" based on these conditions. (3 marks)
	<pre> #include <iostream> using namespace std; int main() { int age, height, weight; cout<<"This program is used to check the prerequisite for a soldier candidate."; cout<<"Enter your age: "; cin>>age; cout<<"Enter your weight: "; cin>>weight; cout<<"Enter your height: "; cin>>height; if (age>=18 && age<=30) //check for age range { if (weight>=50 && weight<=65) //check for weight range { if(height>156) //check for height { cout<<"Fulfill requirements"; } } else { cout<<"Do not fill requirements"; } } else { cout<<"Do not fulfill requirements"; } return 0; } </pre>

	Henry wants to buy a car. It must be under one of these conditions. Either: (a) The year made: after 2010, cylinder capability: cc between 1.5 to 2.0. <i>or</i> (b) The year made: before 2010 , cylinder capability: cc greater than 2.0. His decision either to "Purchase car" or "Do not purchase car" should be reflected in the code. (4 marks)
	<pre> #include <iostream> using namespace std; void displayCode(int num) { cout<<"1.Purchase car\n"; cout<<"2.Do not purchase car\n"; cout<<"Please enter the number: "; cin>>num; if (num==1) { cout<<"Thank you for buying from us!\n"; } else if (num==2) { cout<<"Thank you for visiting us. Have a wonderful day.\n"; } else { cout<<"Sorry, wrong entered number"; } return; } int main() { int year, code; double cc; //cylinder capabilities cout<<"Hi, to buy a car, you must choose either\n"; cout<<"a)The year made: after 2010, cylinder capability: cc between 1.5 to 2.0.\n"; cout<<"b) The year made: before 2010 , cylinder capability: cc greater than 2.0.\n"; cout<<"Please choose year made: "; cin>>year; cout<<"Please choose cc: "; </pre>

```
cin>>cc;
```

```
if (year>2010) //check for year made
```

```
{
```

```
    if (cc>=1.5 && cc<=2)
```

```
    {
```

```
        displayCode(code); //prompt user whether to purchase or not
```

```
    }
```

```
    else
```

```
    {
```

```
        cout<<"Sorry, it is not available.\n";
```

```
    }
```

```
}
```

```
if (year<2010)
```

```
{
```

```
    if (cc>2)
```

```
    {
```

```
        displayCode(code);
```

```
    }
```

```
    else
```

```
    {
```

```
        cout<<"Sorry, it is not available.\n";
```

```
    }
```

```
}
```

```
return 0;
```

```
}
```

8. What is the output for the following code excerpts?

[5 marks]

Code	Output
<pre>int n = 0; if (n = 0) cout << "Yes"; else cout << "No"; }</pre>	No
<pre>int i=10, j=3,k = 20; cout << ((j < 4) (j == 5) && (i <= k));</pre>	1
<pre>int x = 13, y = 9; if (x >= y) if (y > 0) x = x * y; else if (y < 4) x = x - y; cout << x;</pre>	117

9. Fill in the spaces provided in order for the program segment to produce the output as shown.

```
// Question 9.a. - [8 marks]

int x =16; //(a)

do {
    x--;

    if (x % 2== 1) // (b) and (c)

        continue;

    cout << x << " ";

} while (x >= 4); // (d)
```

Output:

14 12 10 8 6 4

```
// Question 9.b. - [6 marks]

int y = 2;

do {

    if (y >256) // (a)

        break;

    cout << y << " ";

    y = pow(y,2); // (b)

} while (y >= 2); // (c)
```

Output:

2 4 16 256

10. Based on the flowchart given in **Figure 1**, answer parts (i) to (iii) of this question.

[10marks]

i. Convert the given flowchart into its equivalent C++ code excerpt. (4 marks)

```
#include <iostream>
using namespace std;
int main(){
    int sum = 0;
    int i = 5;
    while (i<10)
    {
        sum=sum+1;
        i=i+2;
    }
    cout<<sum<<endl;
    return 0;
}
```

ii. How many times the loop repeat. (1 mark)

- Three times

iii. Modify your code by using decrement counter loop without changing the variables involved and the number of loops involved. (4 marks)

```
#include <iostream>
using namespace std;
int main( )
{
    int sum = 0;
    int i = 5;
    while (i>0)
    {
        sum=sum+1;
        i=i-2; }
    cout<<sum<<endl;
    return 0;}
```

11. **Program 3** is able to count the number of input characters of **A**, **B** and **C**. The program will loop reading the input until the sentinel value **e** is being input. The sample output of the program is as shown:

[20 marks]

```
Enter the letter grades[Enter 'e' character to end input]  A
Enter the letter grades[Enter 'e' character to end input]  B
Enter the letter grades[Enter 'e' character to end input]  C
Enter the letter grades[Enter 'e' character to end input]  C
Enter the letter grades[Enter 'e' character to end input]  C
Enter the letter grades[Enter 'e' character to end input]  e

Totals for each letter grade are:
A: 1
B: 1
C: 3
Press any key to continue . . .
```

Complete **Program 3** based on the comments given

```
1  //Program 3
2  #include <iostream>
3  using namespace std;
4
5  int main()
6  {
7      char grade; // one grade
8      int aCount = 0; // number of characterAs
9      int bCount = 0; // number of Bs
10     int cCount = 0; // number of Cs
11
12     cout << "Enter the letter grades[Enter 'e' character to
13     end  input]"<< endl;
14     cin>>grade;
15
16     // loop: as long as sentinel value has not been achieved
17     while(grade!='e'){ // (a) - 2 marks
18
19
```

```

20  //write appropriate statement for testing input cases
21  switch(grade){ // (b) - 2 marks
22  //in case of input A, increment variable aCount - 3 marks
23  case 'A': // (c)
24      aCount++; // (d)
25      break; // (e)
26  //in case of input B, increment variable bCount - 3 marks
27  case 'B': // (f)
28      bCount++; // (g)
29      break; // (h)
30
31  //in case of input C, increment variable cCount - 3 marks
32  case 'C': // (i)
33      cCount++; // (j)
34      break; // (k)
35
36  //add the statement to catch all other alphabets and prints
37  /"Incorrect letter grade entered." - 3 marks
38
39  default: // (l)
40      cout<<"Incorrect letter grade entered."<<endl; // (m)
41      break; // (n)
42
43  } // end test cases
44
45  //ask for another input letter grades - 2 marks
46
47  cout << "Enter the letter grades[Enter 'e' character to end
48  input]"<< endl; // (o)
49
50  cin>>grade; // (p)
51
52  } // end loop
53
54  cout<<"Total for each letter grade are:"<<endl; // output
55  summary of results - 2 marks
56
57  cout<<"A:  "<<aCount<<endl;//(q)display number of A
58  grades cout<<"B:  "<<bCount<<endl;//(r)display number of
59  B grades cout<<"C:  "<<cCount<<endl;//(s)display number
60  of C grades
61
62  return 0;
63  } // end function main

```

12. Complete **Program 4** below based on the given instructions within the program. [10 marks]

```
1  //Program 4
2  //Include suitable libraries @ header file (2 marks)
3  #include<iostream>
4  #include <iomanip>
5
6  using namespace std;
7
8  #define LOW 30 // lowest value in range
9
10 #define HIGH 200 // highest value in range
11
12 #define EXIT 0 // sentinel value
13
14 int main()
15 {
16     int userVal; // user input
17     int extremeCnt = 0; // extreme values counter
18     int sum = 0; // total values of user inputs
19     int num = 0; // no of user inputs
20     double avg; // average of user inputs
21
22     // Prompt user to input the first number
23     cout << "Enter a number ("<< 0 <<" to quit):";
24     cin >> userVal;
```

```

23  /* Write WHILE loop that allow user to:
24      - Input number(s) continuously until user enter '0' -
25      Count no of user inputs and extreme values counter -
26      Calculate total value of user inputs
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51

```

(4 marks) */

```

while(userVal!=EXIT){//when user enter 0 the prompt user will stop

    num++;//increment no of user input

    sum+=userVal;//calculate total value of user inputs

    if((userVal<LOW)|| (userVal>HIGH))//increment the extreme values
    when user input not in between 30-200

    {

        extremeCnt++;}

    cout << "Enter a number ("<< 0 <<" to quit):";// Prompt user to
    input the next number

    cin >> userVal;

}

/* Calculate the average value for the user inputs    Display
the number of extreme values (4 marks) */

avg = static_cast<double>(sum) / num;

cout<<fixed<<showpoint<<setprecision(2)<<"Average                is:
"<<avg<<endl;//to show 2 decimal places for average value

cout<<"There were "<<extremeCnt<<" extreme values"<<endl;

    return 0;

} //end main

```