



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF SOCIAL SCIENCES AND
HUMANITIES

SECJ1013 - 05 (PROGRAMMING TECHNIQUE I)

SEMESTER 1, 2020/2021 ASSIGNMENT 2

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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:

1 0 . 3 4 5 7
5

1 0 . 3 , 5 1 . 7

1 0 . 3 4 6

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: <table border="1"><tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>	A	B	C	D	E	F	G							
A	B	C	D	E	F	G									
Code 2: [2 marks] <pre>cin.getline(x,13); cout<<x<<endl;</pre>	Output: <table border="1"><tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td><td></td><td>H</td><td>I</td><td>J</td><td>K</td><td></td></tr></table>	A	B	C	D	E	F	G		H	I	J	K		
A	B	C	D	E	F	G		H	I	J	K				
Code 3: [3 marks] <pre>cin>>x; cout<<setw(13)<<x<<endl;</pre>	Output: <table border="1"><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td><td></td></tr></table>							A	B	C	D	E	F	G	
						A	B	C	D	E	F	G			

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

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

[12 marks]

	if...else statement	Conditional expression
i.	<pre> if (score >= 50) { numPass++; cout<<"Pass"; } else { numFail++; cout<<"Please try again."; } </pre>	<pre> (score >= 50) ? (numPass++, cout << "Pass") : (numFail++, cout << "Please try again."); //if score is 50 or above //value of numPass will increase by 1 // message "Pass" printed //if score is below 50 //value of numFail will increase by 1 //message "Please try again." printed </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) ? "Dean's List" : "Normal Pass") : ((cpa>=1.7) ? "Probation" : "Fail"); /*if cpa is 3.5 or above, status is Dean's List if cpa is 2.0 and above and below 3.5, status is Normal Pass. if cpa is 1.7 and above and below 2.0, status is Probation. if cpa is below 1.7, status is 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> if (freq > 100 && freq < 10000){ cout << "Acceptable"; } else{ cout << "Unacceptable"; } </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> if (age > 18 && age < 30 &&){ if (weight > 50 && weight < 65 && height > 156){ cout << "Fulfill requirements"; } else{ cout << "Do not fulfill requirements"; } } else{ cout << "Do not fulfill requirements"; } </pre>
iii.	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> if (year > 2010 && cc > 1.5 && cc < 2.0) (year < 2010 && cc > 2.0){ cout << "Purchase car"; } else{ cout << "Do not purchase car"; } </pre>

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.

<pre>// Question 9.a. - [8 marks] int x = _____ 15 _____; // (a) do { x--; if (x % _____ 2 _____ == _____ 1 _____) // (b) and (c) continue; cout << x << " "; } while (x >= _____ 4 _____); // (d)</pre>
Output: 14 12 10 8 6 4

<pre>// Question 9.b. - [6 marks] int y = 2; do { if (y _____ > 256 _____) // (a) break; cout << y << " "; y = _____ y * y _____; // (b) } while (y >= _____ 2 _____); // (c)</pre>
Output: 2 4 16 256

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

[10 marks]

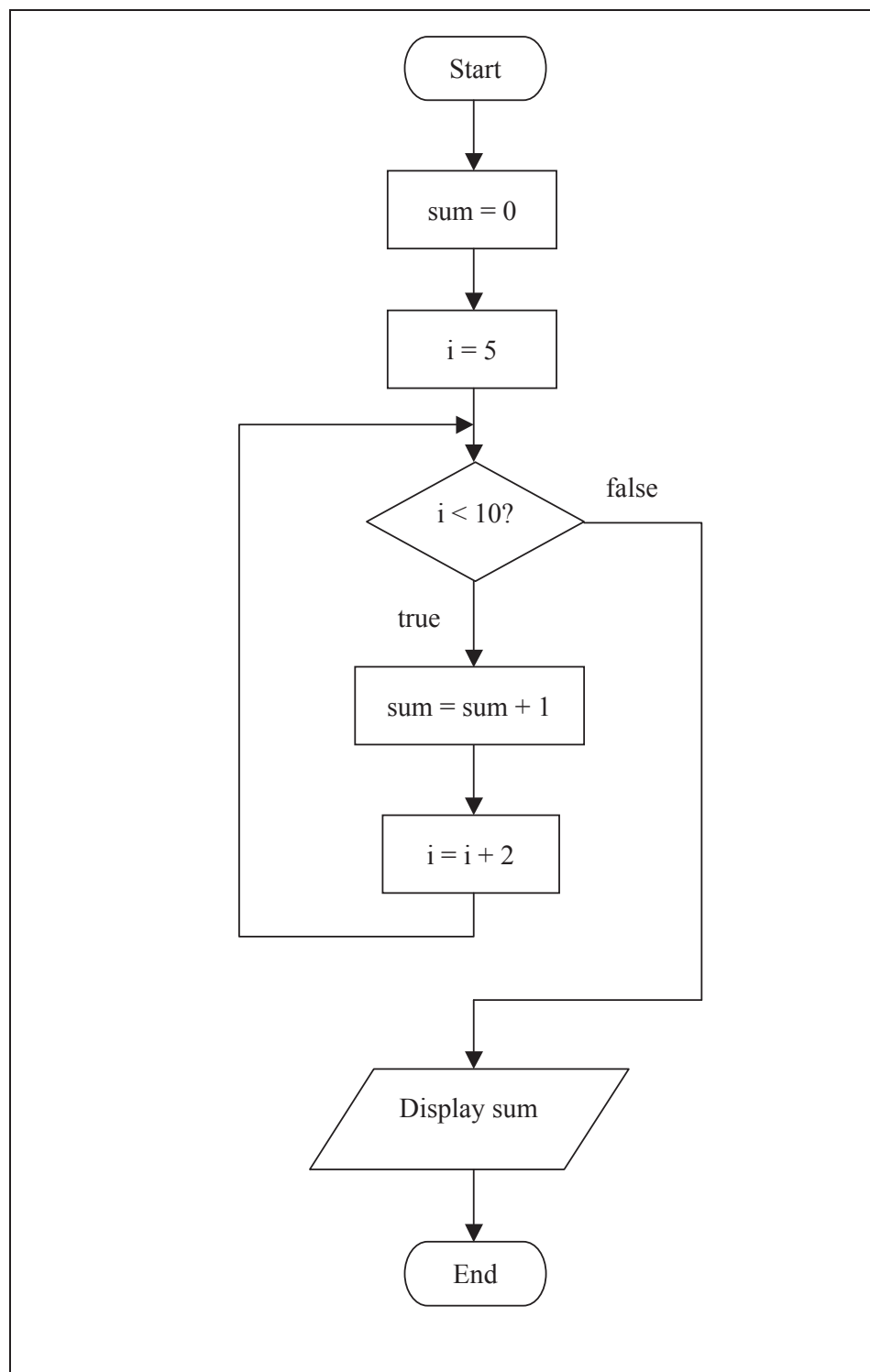


Figure 1

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

```
#include <iostream>
using namespace std;
int main()
{
    int sum = 0, i = 5;

    while(i<10){
        sum = sum + 1;
        i = i + 2;
    }
    cout << sum;
    return 0;
}
```

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

3

- 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, i = 10;

    while ( i > 5){
        sum = sum + 1;
        i = i - 2;
    }

    cout << sum;
    return 0;
}
```

11. **Program 3** is able to count the number of input character 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 end
13     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
23 //in case of input A, increment variable aCount - 3 marks
24
25 case 'A' : // (c)
26     aCount ++; // (d)
27     break; // (e)
28
29 //in case of input B, increment variable bCount - 3 marks
30
31 case 'B' : // (f)
32     bCount ++; // (g)
33     break; // (h)
34
35 //in case of input C, increment variable cCount - 3 marks
36
37 case 'C' : // (i)
38     cCount ++; // (j)
39     break; // (k)
40
41 //add the statement to catch all other alphabets and prints
42 // "Incorrect letter grade entered." - 3 marks
43
44 default : // (l)
45     cout << "Incorrect letter grade entered." // (m)
46     break; // (n)
47
48 } // end test cases
49
50 //ask for another input letter grades - 2 marks
51 cout << "Enter the letter grades[Enter 'e' character to end input]\n"; // (o)
52 cin >> grade; // (p)
53
54 } // end loop
55
56 // output summary of results - 2 marks
57
58 cout << aCount << endl; // (q) display number of A grades
59 cout << bCount << endl; // (r) display number of B grades
60 cout << cCount << endl; // (s) display number of C grades
61
62 return 0;
63 } // end function main

```

12. Write a **Program 4** that allows user to:
- (i) Input integer number(s) continuously until they decide to terminate/quit the program by entering '0' (zero).
 - (ii) Count how many times the user input any extreme values that are numbers, which **not in the range** of 30 to 200.
 - (iii) Calculate the average value for the user inputs.

Figure 2 shows the output sample for the case of extreme values are being input, while **Figure 3** shows the output sample for the case of no extreme values are being input.

```
Enter a number (0 to quit) : 201
Enter a number (0 to quit) : 205
Enter a number (0 to quit) : 29
Enter a number (0 to quit) : 25
Enter a number (0 to quit) : 0

Average is: 115.00
There were 4 extreme values
Press any key to continue . . .
```

Figure 2

```
Enter a number (0 to quit) : 30
Enter a number (0 to quit) : 200
Enter a number (0 to quit) : 40
Enter a number (0 to quit) : 0

Average is: 90.00
There were 0 extreme values
Press any key to continue . . .
```

Figure 3

Complete **Program 4** below based on the given instructions within the program.

[10 marks]

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

```

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                                          (4 marks) */
28
29      while(userVal != EXIT)                // exit loop when userVal = 0
30      {
31          if(!(userVal >= LOW && userVal <= HIGH))
32          {
33              extremeCnt++;    //add the number of extreme values by 1
34          }
35          sum = sum + userVal;    //total up the value inputted by user
36          num++;                //total up the number of loops repeated
37          //Prompt the user to input the next number
38          cout << "Enter a number (" << 0 << " to quit).";
39          cin >> userVal;
40      } // end loop
41
42  /* Calculate the average value for the user inputs
43      Display the number of extreme values                (4 marks) */
44
45      avg = sum/num;                // calculate average
46      cout << "\nAverage is: " << fixed << setprecision(2) << avg << endl;
47      cout << "There were " << extremeCnt << " extreme values" << endl;
48      system("pause");
49      //display the average and the number of extreme values
50      return 0;
51
52  } //end main

```