



**FACULTY OF ENGINEERING SCHOOL OF
COMPUTING**

SUBJECT:

SECJ 1013 - 05 (PROGRAMMING TECHNIQUE I)
SEMESTER 1, 2020/2021

ASSIGNMENT 2

GROUP MEMBERS:

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SUBMIT TO:

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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 IJKL". 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><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><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><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><td></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><tr><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><td></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	// 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.

[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."); </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> 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> 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 && weight>50&&weight<65 && height>156){ cout<<" 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. or (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; do { x--; if (x %2 == 1) continue; cout << x << " "; } while (x >=4);</pre>	
	<pre>// (a) // (b) and (c) // (d)</pre>
Output: 14 12 10 8 6 4	

<pre>// Question 9.b. - [6 marks] int y = 2; do { if (y>300) break; cout << y << " "; y = pow(y, 2); } while (y >= 2</pre>	
	<pre>// (a) // (b) // (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]

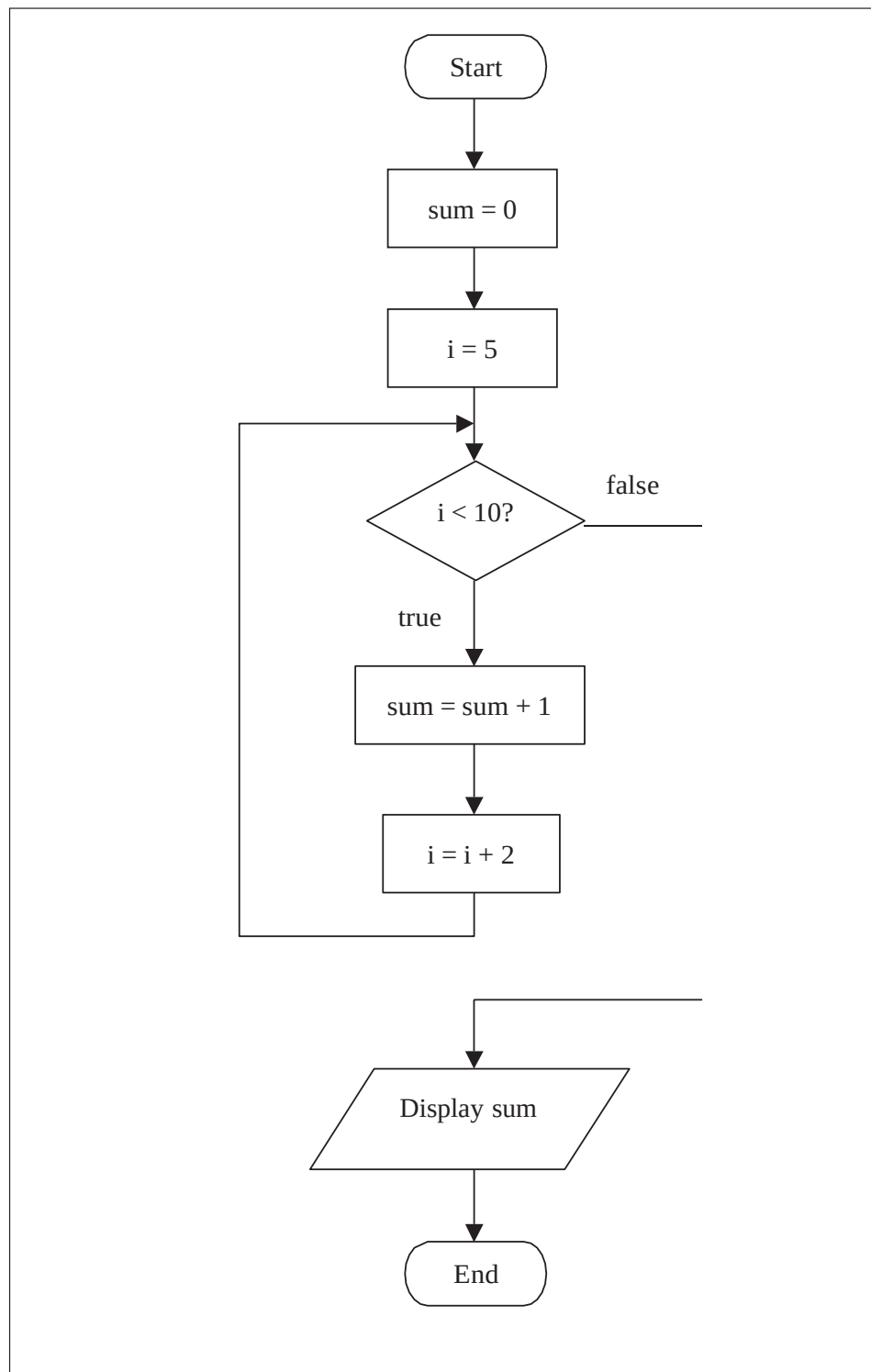


Figure 1

- 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 += 1;
        i += 2;
    }

    cout << sum << endl;

    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 = 5;
    while (i > 0)
    {
        sum += 1;
        i -= 2;
    }

    cout << sum << endl;

    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
```

```

//write appropriate statement for testing input cases
____switch (grade)____ {           // (b)           - 2 marks

//in case of input A, increment variable aCount           - 3 marks

    case 'A' :                               // (c)
        aCount++;                           // (d)
        ____ break; ____                    // (e)

//in case of input B, increment variable bCount           - 3 marks

    case 'B' :                               // (f)
        ____ bCount++; ____                // (g)
        ____ break; ____                    // (h)

//in case of input C, increment variable cCount           - 3 marks

    case 'C' :                               // (i)
        ____ cCount++; ____                // (j)
        ____ break; ____                    // (k)

//add the statement to catch all other alphabets and prints
//"Incorrect letter grade entered."           - 3 marks

    _default :                               // (l)
        cout << "Incorret letter grade entered." ; // (m)
        ____ break; ____                    // (n)

} // end test cases

//ask for another input letter grades           - 2 marks
cout << "Enter the letter grades[Enter 'e' character to end
input]"<< endl;                               // (o)
cin>>grade; ____                             // (p)

} // end loop

// output summary of results           - 2 marks

cout <<"A: "<<aCount <<endl; // (q) display number of A grades
cout <<"B: "<<bCount <<endl;_ // (r) display number of B grades
cout <<"C: "<<cCount <<endl; // (s) display number of C grades

    return 0;
} // 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 //Program 4
2 //Include suitable libraries @ header file (2 marks)
3 #include <iostream>
4 #include <iomanip>
5 using namespace std;
6
7 #define LOW 30 // lowest value in range
8 #define HIGH 200 // highest value in range
9 #define EXIT 0 // sentinel value
10
11 int main()
12 {
13     int userVal; // user input
14     int extremeCnt = 0; // extreme values counter
15     int sum = 0; // total values of user inputs
16     int num = 0; // no of user inputs
17     double avg; // average of user inputs
18
19     // Prompt user to input the first number
20     cout << "Enter a number (<< 0 << " to quit):";
21     cin >> userVal;
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==0)){
30      if(!(userVal>=30 && userVal<=200)) extremeCnt++;
31      sum+= userVal;
32      num++;
33      cout << "Enter a number ("<< 0 <<" to quit) : ";
34      cin >> userVal;
35      _____
36      _____
37      _____
38      _____
39      _____
40      _____
41
42  /* Calculate the average value for the user inputs
43      Display the number of extreme values          (4 marks) */
44
45  avg=sum/num;
46  cout << "\nAverage is: " <<fixed<<setprecision(2)<<avg<<endl;
47  cout << "There were "<<extremeCnt<<" extreme values";
48  _____
49
50      return 0;
51
52  } //end main

```