

# **CS-1002: Programming Fundamentals (BS-CY)**

Monday, 26<sup>th</sup> September, 2022

## **Course Instructor**

Dr. Mudassar Aslam, Mr. Jawad Hassan

Serial No:

**Sessional Exam-I**

**Total Time: 1 Hour**

**Total Marks: 52**

\_\_\_\_\_  
Signature of Invigilator

\_\_\_\_\_  
Student Name                      Roll No.                      Section                      Signature

**DO NOT OPEN THE QUESTION BOOK OR START UNTIL INSTRUCTED.**

### **Instructions:**

1. Attempt on question paper. Attempt all of them. Read the question carefully, understand the question, and then attempt it.
2. No additional sheet will be provided for rough work. Use the back of the last page for rough work.
3. After asked to commence the exam, please verify that you have **ten (10)** different printed pages including this title page. There are a total of **2** questions.
4. Calculator sharing is strictly prohibited.
5. Use permanent ink pens only. Any part done using soft pencil will not be marked and cannot be claimed for rechecking.

	<b>Q-1</b>	<b>Q-2</b>	<b>Total</b>
<b>Marks Obtained</b>			
<b>Total Marks</b>	<b>42</b>	<b>10</b>	<b>52</b>

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## Question 1 [16+10+08+06 = 40 Marks]

- a) For each of the following expressions, write the output value. You can do your working in the rough work column. ZERO marks for answers without rough work. Consider no syntax errors. [8 \* 2 = 16]

Expression	Value	Rough work
<code>170 % 12 % 5 / 2</code>	1	<code>17%12=2</code> <code>2%5=2</code> <code>2/2=1</code>
<code>!( 7/7 &lt; 1)    7*7 &amp;&amp; 10 + 19.5 &lt; 30</code>	1	<code>1 or 49 and 29.5 &lt; 30</code> <code>1 or 49 and 1</code> <code>1</code>
<code>7 == 2 / 5 * 5 + 7 % 5</code>	0	<code>7 == 0 * 5 + 7 % 5</code> <code>7 == 0 + 2</code> <code>7 == 2</code> <code>0</code>
<code>(5 &gt; 7) * 10 + 5 * 2</code>	10	<code>0 * 10 + 5 * 2</code> <code>0 + 10</code> <code>10</code>
<code>!5 &amp;&amp; 50    13 &amp;&amp; 10-10</code>	0	<code>0 and 50 or 13 and 0</code> <code>0 or 13 and 0</code> <code>0 or 0</code> <code>0</code>
<code>static_cast&lt;float&gt;(6) / 40 + static_cast&lt;char&gt;(65)</code> [Note: ASCII value of 'A' is 65 and 'a' is 97]	65.15	
<code>('b' &gt;= 'A') + ('F'-'A')</code>	6	<code>1 + 5</code> <code>6</code>
<code>static_cast&lt;float&gt;(7/3)</code>	2	
<b>ROUGH WORK (extra space)</b>  <b>Full marks will be given if output is correct and is supported by the working.</b>		

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**b) Write the output that is produced by following codes. [2 + 2 + 3 + 3= 10]**

Code	Output	Rough Work
<pre>double d = 44.8888; int x = 22; cout &lt;&lt; d / x &lt;&lt; endl; cout &lt;&lt; setprecision(4) &lt;&lt; d / x &lt;&lt; endl; cout &lt;&lt; setprecision(6) &lt;&lt; fixed &lt;&lt; d / x &lt;&lt; endl;</pre>	<pre>2.0404 2.04 2.040400</pre>	
<pre>short var1 = 100; long a = 100; cout &lt;&lt; sizeof(var1) &lt;&lt; endl; cout &lt;&lt; sizeof(&amp;var1) &lt;&lt; endl; cout &lt;&lt; sizeof(a) &lt;&lt; endl; cout &lt;&lt; sizeof(2.5) &lt;&lt; endl;</pre>	<pre>2 8 8 8</pre>	
<pre>int alpha = 28, beta = 16; alpha -= alpha / beta; beta += beta - alpha; beta = beta + (2 &amp;&amp; alpha); alpha = alpha - (beta &amp;&amp; alpha); cout &lt;&lt; "\n First Modified value : " &lt;&lt; alpha; cout &lt;&lt; "\n Second Modified value: " &lt;&lt; beta;</pre>	<pre>First Modified value : 26 Second Modified value: 6</pre>	
<pre>int x = 24; int y = 16; double z = 40; int num2 = z / (y * (x / 2 * 10)) + (y * x + 2) / z; cout &lt;&lt; num2 &lt;&lt; endl; double num3 = (y * (x + y) + z) / 16; cout &lt;&lt; num3 &lt;&lt; endl;</pre>	<pre>9 42.5</pre>	
<p><b>ROUGH WORK (extra space)</b></p> <p>Full marks will be given if all outputs are correct. Half Marks will be given if the majority or Half outputs are correct. Otherwise 0 marks will be given.</p>		

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- c) Identify and correct the errors in the following code. Rewrite only the line number where error is found, write the correct statement. Then write code output in the second column. First code is for SAMPLE.  
[2.5 + 2.5 + 5 = 10]

Code	Corrected Line number wise + Output
1. integer a; 2. a = 100; 3. cout<<a;	1. int a; //integer type does not exist 3. cout<<a; //coutttt is wrong  Output: 100
1. int return = 2000; 2. cout << "Loan returned =" << return << endl; 3. int length = 200.5; 4. cout << "Length = " << length; 5. char initial = 'a'; 6. char newchar = initial - 32; 7. cout << newchar << endl; 8. int ch = 100; 9. cout << (char)ch << endl;	1. int r = 2000; 2. cout << "Loan returned =" << r << endl;  <b>Output:</b>  Loan returned =2000 Length = 200A d
1. Float const PI = 3.7; 2. cout << PI + 0.3 << endl; 3. PI = 3.4; 4. cout << "new value \n" << PI << endl;	1. const float PI = 3.7; 3. //PI = 3.4  <b>Output:</b> 4 new value 3.7
1. short 1_var; 2. Short var_2; 3. int Total = 0; 4. cout >> "Enter First value = "; 5. cin << 1_var; 6. Cout << "Enter Second value = "; 7. cin >> var_2; 8. 1_Value + var_2 = Total; 9. cout << "\n Total is : " << total;	1. short var_1; 2. short var_2; 3. int Total = 0; 4. cout << "Enter First value = "; 5. cin >> var_1; 6. cout << "Enter Second value = ";  8. Total = var_1 + var_2; 9. cout << "\n Total is : " << Total;  <b>Output:</b> Enter First value = 2 Enter Second value = 4  Total is : 6

**i) 2 marks for code corrections and 0.5 marks for output**

**ii) 2 marks for code corrections and 0.5 marks for output**

**iii) 3 marks for code corrections and 2 marks for output**

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d) Write C++ statements or expressions to perform the desired operation. [2 + 2 + 2 = 6]

Required Operation	C++ expression
<pre>float f; cin&gt;&gt;f; bool b; /*write a statement to assign 1 to variable b if user entered a real number; 0 if user enters a whole number*/ cout&lt;&lt;b;</pre>	<pre>b = (f - static_cast&lt;int&gt;(f) &gt; 0);</pre>
<pre>char ch; cin.get(ch); bool b; /*write a statement to assign 0 to variable b if user entered a non-printable character; 1 if user entered a printable character. First 32 characters in the ASCII table are non- printable and values start from 0*/</pre>	<pre>b = !(ch &gt;= 0 &amp;&amp; ch&lt;=31);</pre>
<p><b>De Morgan's Law of Union -&gt; <math>(A \cup B)' = A' \cap B'</math></b></p> <pre>bool A, B, c;  /*Write a C++ statement to assign 1 (i.e. true) to variable c to indicate that the left hand side is equal to the right hand side of the De Morgan's Law equation. Please note that U is same as OR gate; <math>\cap</math> is same as AND gate; and the apostrophe represents NOT operation.*/</pre>	<pre>c=!(A    B) == (!A &amp;&amp; !B);  /*both brackets are important. Missing any one of these will produce wrong output.*/</pre>

**full marks for writing correct expression with desired operation otherwise zero. Zero marks for writing Half correct expression.**

## Question 2 [05+05 = 10 Marks]

- a) Write a C++ program that asks user to enter a four-digit number. Your program should calculate average of all the digits of that number. For example, if user enters 1234 your program will print 2.5; and if user enters 1481, your program will print 3.5. [5]

- 1) accurately declaring variables 1 mark.
- 2) Taking input in integer variable 1 mark
- 3) Separating digits using % and / operator 5 marks
- 4) calculating sum and average 2 mark
- 5) printing output 1 marks

```
#include <iostream>
using namespace std;

int main()
{
    int n=0,sum=0;
    cout<<"Enter a 4-digit number: ";
    cin>>n;

    sum = sum + (n%10);
    n = n/10;

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    sum = sum + (n%10);
    n = n/10;

    cout<<"Average of digits = "<<sum/4.0;

    return 0;
}
```