TUTORIAL 2 (SECJ1013)

PROGRAMMING TECHNIQUE 1

SECTION 04 & 07, SEM 1, 2024/2025

Q#1

The following program has syntax and/ or logical error(s). Find the error(s) as many as you can and write the correct program in the space provided.

```
1   include <iostream>
2   using namespace std;
3
4   int main
5   {
6       float double = 7.8;
7
8       /* Print a value of 'double'
9       return 0;
10
11      cout << "double = " << double
12      << endl;
13  }
```

Q#2

Determine the output for the program segment given in **Table 1**. Write your output with two decimal points if applicable in **Output** column in **Table 1**.

Table 1: Program segment and output for Question 2

Line	Code	Output
1	`int a = 10, b = 4, c, d;`	
2	`float x = 3.5, y;`	
3	`c = a++ % static_cast<int> (x) / 4;`	
4	`d = x * a + --c;`	
5	`a /= d % b++ * x;`	
6	`y = a * c + b / x;`	
7	`b += -c * static_cast<int> (++y);`	
8	`x = y-- * a - x;`	
9		
10	`cout << "a = " << a << endl;`	_____
11	`cout << "b = " << b << endl;`	_____
12	`cout << "c = " << c << endl;`	_____
13	`cout << "d = " << d << endl;`	_____
14	`cout << "x = " << x << endl;`	_____
15	`cout << "y = " << y << endl;`	_____

buat table
values update

Q#3

Determine the output for the program segment given in Table 2. Write your output with decimal points if applicable in **Output** column in Table 2.

Table 2

Line	Code	Output
1	`int a = 3, b, c = -3, d;`	
2	`float e, f = 2.5;`	
3	`b = a * -c;`	
4	`d = a++ / 2 + c;`	
5	`c += a + b % 2;`	
6	`f = 4.0 * d / 6;`	
7	`e = static_cast<float>(3 * a) + f;`	
10		
11	`cout << "a = " << a << endl;` 3	_____
12	`cout << "b = " << b << endl;` 9	_____
13	`cout << "c = " << c << endl;` 5	_____
14	`cout << "d = " << d << endl;` 1	_____
15	`cout << "e = " << e << endl;` 14.5	_____
16	`cout << "f = " << f << endl;` 0.67	_____

Q#4

Given: **`a = 3`**, **`b = 5`**, and **`c = 4`**, determine the value of variable **`z`** for the following expressions. Label the order and results of execution for each operator in the boxes as stated in the expressions. The operator that is evaluated first should be labeled as 1, the second operator to be evaluated should be labeled as 2, and so on. Assume all variables of type **`int`**. For example:

	z	=	a	*	b	+	c
Order of execution				*1*		*2*	
Results of execution				*15*		*19*	

z = 19

	z	=	a	+	b	*	c	--	%	++	b
Order of execution											
Results of execution											

z = _____

Q#5

Program 1 below is meant to ask the user to enter a radius of sphere **r** and display the volume **V** of sphere. The volume of sphere is expressed by the following formula:

$$V = \frac{4}{3}\pi r^3$$

Complete **Program 1**, based on the instructions or comments written in (a) to (e).

Line	Program 1
1	`#include <iostream>`
2	`using namespace std;`
3	
4	`int main()`
5	`{`
6	`// (a) Declare v and r as variables for volume and radius`
7	`//    in floating point data type`
8	`  _____;`
9	
10	`// (b) Declare a constant variable for PI = 3.1415926`
11	`  _____;`
12	
13	`// Display a corresponding prompt to the user cout`
14	`  << "Enter the radius of sphere:";`
15	
16	`// (c) Input radius, r`
17	`  _____;`
18	
19	`// (d) Calculate the volume of sphere.`
20	`  _____;`
21	
22	`// (e) Display the volume of sphere.`
23	`  _____;`
24	`  return 0;`
25	`}`

Q#6

Show the output of the following code with decimal points where applicable.

Line	Program
1	`  int x1, x2, i, j =1, k, y, z;`
2	`  float f; x1 = 1; x2 = 1;`
3	`  y = 5 + x1--;`
4	`  z = 5 + ++x2;`
5	`  i = 6 % 4;`
6	`  j += j + 3;`
7	`  k = 25 / 2;`
8	`  f = static_cast<float>(2 / 5) * k;`
9	
10	`  cout << "x1 is " << x1 << endl;`
11	`  cout << "x2 is " << x2 << endl;`
12	`  cout << "i is " << i << endl;`
13	`  cout << "j is " << j << endl;`
14	`  cout << "k is " << k << endl;`
15	`  cout << "y is " << y << endl;`
16	`  cout << "z is " << z << endl;`
17	`  cout << "f is " << f;`

Q#7

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.

Line	Program
1	`#include <iostream>`
2	`using namespace std;`
3	`int main()`
4	`{`
5	`    int x;//the number entered by the user`
6	
7	`    // (i). Read a number from the keyboard`
8	`    cout << "Enter a single digit integer: ";`
9	
10	`    _____________________________________`
11	
12	`    // (ii). Consider only the prime numbers to be selected`
13	`    if (_____________________________)`
14	`        cout << "The digit is prime" << endl;`
15	`    else`
16	`        cout << "The digit is not prime" << endl;`
17	`    return 0;`
18	`}`

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

Q#8

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.

```
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
```

Q#9

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.

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

Answer: 11

Q#10

Determine the output for the program segment given in Table 3. Write your output with decimal points if applicable in **Output** column in Table 3.

Table 3

Line	Program Segment	Output
1	`int a, b = 2, c, d = 1, e;`	
2	`float p = 3.0, q;`	
3	`a = b * d++;`	
4	`c = ++a / 2 + d;`	
5	`b += a + c % 2;`	
6	`d *= (b - 1) / c;`	
7	`p = c * p / 5;`	
8	`e = --p + 2;`	
9	`q = static_cast<float>(e / 5) * d;`	
10		
11	`cout << "a = " << a << endl;`	_____
12	`cout << "b = " << b << endl;`	_____
13	`cout << "c = " << c << endl;`	_____
14	`cout << "d = " << d << endl;`	_____
15	`cout << "e = " << e << endl;`	_____
16	`cout << "p = " << p << endl;`	_____
17	`cout << "q = " << q << endl;`	_____

Q#11

Given the following declaration:

```
int p = 15, q = 20, r = 6, s = 3, y;
double g = 7.2;
```

Trace the values of each variable in the statements below. Highlight the changes in the values of each variable as you go through the calculation steps one by one based on operator precedence and associativity. Assume that each statement is executed independently.

Example:

```
y = q * r - p;
y = 20 * 6 - 15
y = 120 - 15
y = 105
```

a) `y = p - q / r * s + r;`

b) `g += p % q - static_cast(g) * s;`

c) `s *= r - (q++ / 2);`

d) `y = (++s + r * p);`

Q#12

Identify which of the following variable declarations are incorrect. Give reason for your answer and provide the correct variable declaration.

a) `float number 12;`
b) `char letter = "b";`
c) `int mark = 99.9;`
float d) `long snum = 888888.88;`
e) `double w1 = 10; w2 = 2.55; w4 = 940;`

Q#13

Given the following declaration for four variables. Which of the following assignments is not valid? Give a reason for your answer.

```
1  //Program 2.1
2
3  int m = 2, n = 3;
4  double r = 28.5, s = 5.0;
```

a) `m = r;`
b) `m = n - 2.3;`
✗ c) `s + 2 = r;`
d) `m = 12 / s;`

e) `r = n / s;`
f) `s = m + 1;`
g) `m = s % n;`

Q#14

Write a program that computes the number of days, hours and minutes that can be extracted from the time. The program should assign a value of time in minutes. Determine the result if the value for time is as follows:

a) 8924
b) 732
c) 56