Inspiring Excellence

Course Title: Programming Language I

Course Code: CSE 110

Assignment no: 2

Class Tasks	7
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Class Task 1

Write the Python code of a program that reads a number, and prints "The number is even" or "The number is odd", depending on whether the number is even or odd.

hint(1): we may use the modulus (%) operator to check for even or odd

hint(2): we can consider the number to be an integer

Sample Input	Sample Output
7	The number is odd
10	The number is even
-44	The number is even

Class Task 2

Write the Python code of a program that reads two numbers from the user. The program should then print "First is greater" if the first number is greater, "Second is greater" if the second number is greater, and "The numbers are equal" otherwise.

Sample Input	Sample Output
7 3	First is greater
-33 3	Second is greater
11 11	The numbers are equal

Class Task 3

Write the Python code of a program that reads an integer as input from the user, and prints the integer if it is a multiple of **2 OR 5** and prints "Not a multiple of 2 OR 5" otherwise.

For example, 2, 4, 5, 6, 8, 10, 12, 14, 15, 16, 18, 20, 22 … i.e. this includes multiples of 2 only, multiples of 5 only and multiples of 2 and 5 both.

hint(1): we may use the modulus (%) operator for checking the divisibility

hint(2): we can consider the number to be an integer

Sample Input	Sample Output
5	5
10	10
3	Not a multiple of 2 OR 5

Class Task 4

Write the Python code of a program that reads an integer, and prints the integer if it is a multiple of **2 AND 5** and prints "Not multiple of 2 and 5 both" otherwise.

For example, 10, 20, 30, 40, 50 … i.e. this only includes numbers which are multiples of both 2 and 5.

hint(1): we may use the modulus (%) operator for checking the divisibility

hint(2): we can consider the number to be an integer

Sample Input	Sample Output
30	30
15	Not multiple of 2 and 5 both
6	Not multiple of 2 and 5 both

Class Task 5

Write a python program that takes the CGPA and no of credits completed by a student and prints whether the student is eligible for a waiver and of what percentage.

To be eligible for a waiver, a student must have completed at least 30 credits and earned a CGPA greater or equal to 3.8. If not, please print "The student is not eligible for a waiver".

CGPA	**Waiver percentage**
3.80 - 3.89	25 percent
3.90 - 3.94	50 percent
3.95 - 3.99	75 percent
4.00	100 percent

Now let’s look at the samples.

Sample Input	Sample Output
3.93 78	The student is eligible for a waiver of 50 percent
3.79 24	The student is not eligible for a waiver

Class Task 6

What will be the output of the following program? Your answer will not be accepted without the workings.

```
1  p = 5
2  q = 6
3  r = 9
4  sum = 0
5  if (p < 12):
6      print(r + 2)
7  else:
8      print(r + p)
9  if (q > 20):
10     print(r + 19)
11 elif (q <= 6):
12     print(q + 3)
13 else:
14     print(p + q + r)
15 if (r > 15):
16     print(r)
17 elif (r == 0):
18     print(p + q)
19 else:
20     print(p)
21 if (sum != 0):
22     print(3)
```

```
23  else:
24      print(sum + 32)
25  if (p > 0 and r < 10):
26      print(p + r)
27  else:
28      print(p - r)
```

Output

Class Task 7

What will be the values of result1 to result5 after running the following program? Your answer will not be accepted without the workings.

```
1  var1 = var2 = True
2  var3 = var4 = var5 = False
3  result1 = result2 = result3 = True
4  result4 = result5 = False
5  var1 = 4 > 3 - 1
6  var2 = False and var1
7  var3 = True
8  var4 = False
9  var5 = not(var3 or var4)
```

10	result1 = (var1 or var2) and (8 * 10 > 45)
11	result2 = (var1 or var2) and (result1 and False)
12	result3 = (var1 and not result1) or result2
13	result4 = (var1 or var2) or not((var5 and var1) and False)
14	result5 = (not var1 and var4) and (result3 or var3)

Output:

result1	
result2	
result3	
result4	
result5	

Class Evaluation Task 1

Write a Python program to compute and display a person's weekly salary as determined by the following conditions:

- If the hours worked is less than or equal to 40, then the person receives Tk 200 per hour.
- If the hours worked is greater than 40, then the person receives Tk 8000 plus Tk 300 for each hour worked over 40 hours.

The program should request the hours worked as an input from the user and display the salary as output. You need to make sure that user input is valid. For example, a person cannot work for -5 hours or more than 168 hours in a week. So, the valid hours range is 0 to 168. For invalid hours, print outputs as given in the samples below.

Hint: you can consider the hour (user input) to be an integer

Sample Input	Sample Output	Explanation
100	26000	Since, the number of hours worked is 100 > 40, therefore salary = 8000 + (100 - 40) * 300 = 26000
30	6000	Since, the number of hours worked is 30 < 40, therefore salary = 30 * 200 = 6000
-30	Hour cannot be negative	Invalid input, because hours should always be greater than or equal to zero
170	Impossible to work more than 168 hours weekly	Invalid input, because the valid work hour range is 0 to 168

Class Evaluation Task 2

Write the Python code of a program that finds the number of hours, minutes, and seconds in a **given number of seconds.** The number of seconds is taken as input from the user.

*hint(1): **This is not a branching problem.** We may consider our user input to be an integer value and use just // and % operators to solve the problem*

hint(2): 1 hour = 60 minutes = 3600 seconds and *1 minute = 60 seconds*

Sample Input	Sample Output	Explanation
10000	Hours: 2 Minutes: 46 Seconds: 40	10000 // 3600 = **2 hours** and 10000 % 3600 = 2800 *(remaining seconds)* Then again, 2800 // 60 = **46 minutes** and 2800 % 60 = **40 seconds** And hence we have arrived at our answer.
500	Hours: 0 Minutes: 8 Seconds: 20	500 // 3600 = **0 hours** and 500 % 3600 = 500 *(remaining seconds)* Then again, 500 // 60 = **8 minutes** and 500 % 60 = **20 seconds**

Class Evaluation Task 3

Suppose, your friend is building an automated car called “Besla”. He needs to fix the programming of the car so that it runs at a proper speed. Now, write a python program that takes 2 inputs (distance in meters and time in seconds). The program should then print the velocity in kilometers per hour of that car. Also, it should print whether the car is working properly based on the following chart.

Velocity	**Information to be printed**
Less than 60 km/h	Too slow. It needs more changes.
Between 60 km/h to 90 km/h	Velocity is okay. The car is ready!
Greater than 90 km/h	Too fast. Only a few changes should suffice.

Now let’s look at the samples.

Sample Input	Sample Output	Explanation
160000 7200	80.0 km/h Velocity is okay. The car is ready!	After the conversion of distance and time, the velocity is (160/2) km/h = 80 km/h. So, the velocity is okay.
25400 3600	25.4 km/h Too slow. It needs more changes.	After the conversion of distance and time, the velocity is (25.4/1) km/h = 25.4 km/h. So the speed is too slow.

Home Task 1

Write the Python code of a program that reads two numbers, subtracts the smaller number from the larger one, and prints the result.

Hint: First, we may check which number is greater

Sample Input	Sample Output	Explanation
-40 -4	36	-4 > -40, so -4 - (-40) = -4 + 40 = 36
6 2	4	6 > 2, so 6 - 4 = 0
5 5	0	5 is not greater than 5, so 5-5 = 0

Home Task 2

Write the Python code of a program that reads an integer, and prints the integer it is a multiple of **either 2 or 5 but not both.** If the number is a multiple of 2 and 5 both, then print "Multiple of 2 and 5 both". For all other numbers, the program prints "Not a multiple we want".

For example, 2, 4, 5, 6, 8, 12, 14, 15, 16, 18, 22 … i.e. this includes multiples of 2 only and multiples of 5 only, NOT multiples of 2 and 5 both or other numbers.

hint(1): we may use the modulus (%) operator for checking the divisibility

hint(2): we can consider the number to be an integer

Sample Input	Sample Output
6	6
15	15
10	Multiple of 2 and 5 both
17	Not a multiple we want

Home Task 3

Suppose the following expressions are used to calculate the values of L for different values of S:

$$L = 3000 - 125S^2 \text{ if } S < 100$$

$$L = \frac{12000}{4+S^2/14900} \text{ if } S \geq 100$$

*hint(1): you can import math and use math function for making squares with math.pow(number, power) or you can simply write S ** 2.*

hint(2): the value of S(user input) will be an integer

Sample Input	Sample Output	Explanation
120	2416.2162162162163	Since S (user input) given here is 120 >= 100, so L = 12000 / (4 + (120 * 120)/14900) = 2416.2162162162163
3	1875	Since S (user input) given here is 3 < 100, so L = 3000 - 125 * 3 * 3 = 1875

Home Task 4

Write a Python program that takes an hour from the user as input and tells it is time for which meal.

• The user will input the number in a 24-hour format. So, 14 means 2 pm, 3 means 3 am, 18 means 6 pm, etc.

• Valid inputs are 0 to 23. Inputs less than 0 or more than 23 are invalid in 24-hour clock.

• Assume, input will be whole numbers. For example, 3.5 will NOT be given as input.

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Input range: Message to be printed

4 to 6: Breakfast

12 to 13: Lunch

16 to 17: Snacks

19 to 20: Dinner

For all other valid inputs, say "Patience is a virtue"

For all other invalid inputs, say "Wrong time"

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For example,

If the user enters 4, your program should print the message "Breakfast".

If the user enters 5, your program should print the message "Breakfast".

If the user enters 6, your program should print the message "Breakfast".

If the user enters 0, your program should print the message "Patience is a virtue".

If the user enters 1, your program should print the message "Patience is a virtue".

If the user enters 18, your program should print the message "Patience is a virtue".

If the user enters 23, your program should print the message "Patience is a virtue".

If the user enters 24, your program should print the message "Wrong Time".

If the user enters -1, your program should print the message "Wrong Time".

If the user enters 27, your program should print the message "Wrong time".

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Hints: You can use nested conditionals (if-else) or chained conditions (if-elif-else) to solve this problem.

Home Task 5

Write the Python code of a program that reads a student's mark for a single subject, and prints out the corresponding grade for that mark. The mark ranges and corresponding grades are shown in the table below. You need to make sure that the mark is valid. For example, a student cannot receive -5 or 110 marks. So, the valid marks range from 0 to 100.

hint(1): you can consider the number to be an integer

hint(2): this problem can be solved in two ways: top-down (starts from A) and bottom-up (starts from F)

Marks	**Grade**
90 or above	A
80-89	B
70-79	C
60-69	D
50-59	E
Below 50	F

Home Task 6

What will be the output of the following program? Show the workings.

```
1  num1 = 10
2  num2 = -3
3  num3 = -1
4  sum = num1 + num2 + num3
5  if (num3 < 0):
6      print(num3 * -2)
7  else:
8      print(sum)
9  if (num1 < 5):
10     print(num1 + 10)
11 elif (num2 == -3):
12     num2 = num1
13     print(num2)
14 else:
15     print(num1 + num2 + num3)
16 if (num1 > 15):
17     print(num1)
18 elif (num2 == 0):
19     print(num2 + num3)
20 else:
21     print(num3)
22 if (sum != 0):
23     print(100)
```

```
24  else:
25      print(sum + 100)
26  if (num1 > 0 and num2 < 0):
27      print(num1 == num2)
28  else:
29      print("False")
```

Output

Home Task 7

What will be the values of result1 to result10 after running the following program? Your answer will not be accepted without the workings.

```
1   var1 = False
2   var2 = False
3   var3 = False
4   var4 = False
5   var5 = False
6   var6 = False
7   result1 = False
8   result2 = False
9   result3 = False
10  result4 = False
```

11	result5 = False
12	result6 = False
13	result7 = False
14	result8 = False
15	result9 = False
16	result10 = False
17	var1 = ((not True) or True) and False
18	var2 = var1 and False
19	var3 = True and not False
20	var4 = False
21	var5 = True
22	var6 = var3 and False
23	result1 = (var1 and var2) and (40 % 3) > 45 or (var5 and var6)
24	result2 = (var1 or var2) or (result1 and False)
25	result3 = (var1 and result1) or result2 or var5
26	result4 = (var1 or var2) or ((var3 and var1) and False)
27	result5 = (var1 and var2) and (result3 or var1)
28	result6 = ((var3 or (not var2)) and (result5)) or True
29	result7 = (var4 and result1) and ((result1 and False) or True)
30	result8 = ((var1 and result3) and ((not var5) or var6)) and True
31	result9 = ((result2 and var2) or ((not result7) and var1)) and not False
32	result10 = not(var1 and True)

Output:

result1	
result2	

result3	
result4	
result5	
result6	
result7	
result8	
result9	
result10	

Home Task 8

What will be the values of result1 to result10 after running the following program? Your answer will not be accepted without the workings.

1	`var1 = var2 = var3 = var4 = var5 = var6 = False`
2	`result1 = result2 = result3 = result4 = result5 = result6 = False`
3	`result7 = result8 = result9 = result10 = False`
4	`var1 = (not False or False) and True`
5	`var2 = var1 and True`
6	`var3 = False and not True`
7	`var4 = True`
8	`var5 = False`
9	`var6 = var3 and True`
10	`result1 = (var1 and var2) and ( 40 % 3 > 45) or (var5 and var6)`
11	`result2 = (var1 or var2) or (result1 and False)`
12	`result3 = (var1 and result1) or result2 or var5`
13	`result4 = (var1 or var2) or ((var3 and var1) and False)`
14	`result5 = (var1 and var2) and (result3 or var1)`

15	`result6 = ((var3 or not var2) and (result5)) or True`
16	`result7 = (var4 and result1) and ((result1 and False) or True)`
17	`result8 = ((var1 and result3) and (not var5 or var6)) and True`
18	`result9 = ((result2 and var2) or (not result7 and var1)) and not False`
19	`result10 = not (var1 and True)`

Output:

result1	
result2	
result3	
result4	
result5	
result6	
result7	
result8	
result9	
result10	

Next lab
Iteration