Course Code: CSC 101	Course Title: Introduction to programming	Semester: Summer 2022
Set: D	Time: 2 Hours	Date: 17.11.2022

General Instructions:

1. Answer **all the questions** in the answer script. Do not write anything on the question paper.
2. Write your **name, Student id, Section and set no** clearly on top of your answer script. Take help from the invigilator in case you need assistance.
3. **Return** the **answer script and the question paper** to the invigilator at the end of your exam.
4. Marks on the right margin indicate full marks.

Specific Instructions:

1. **Sign the Attendance Sheet**. Otherwise, if your answer script is lost you can't claim your attendance.
2. No Mobile / Electronic Devices are allowed in the exam hall. Switch off your mobile phone and put it in your bag.
3. Use of Calculator is STRICTLY prohibited.

1. Trace out the output of the following code: (Marks: 04)

```python
x = int(input("Enter a number: "))
y = 1
z = 0

while 2 * y <= x:
    y = 2 * y
    z += 1

print(y, z)
```

Write the output of the code for the following inputs:

```
a. 1
b. 6
c. 19
d. 39
```

2. Trace out the output of the following code: (Marks: 03)

```python
x = int(input("Enter a number: "))
y = int(input("Enter a number: "))

z = y

while x%z == 0:
    print(f"({x}, {z})")
    x -= z
    z += 1

print(x, y, z)
```

Write the output of the code for the following inputs:

a. 12, 4
b. 14, 2
c. 27, 3

3. Check out the following code: (Marks: 04)

```python
x = int(input("Enter a number: "))
y = int(input("Enter a number: "))
z = 4

if x+y >= 10:
    z = z + 1
else:
    z = z + 9

if z <= y:
    y += 1

print(x, y, z)
```

Write the output of the code for the following inputs:

a. 3, 20
b. 4, 5
c. 5, 5
d. 6, 10

4. Check out the following code: (Marks: 04)

```python
a = int(input("Enter a number: "))
b = int(input("Enter a number: "))
```

```
if a * 2 < b:
    a = a * 3
elif a > b:
    b = b + 3
if b < a:
    b += 1
else:
    a -= 1


print(a, b)
```

Write the output of the code for the following inputs:

```
a. 10, 2
b. 3, 8
c. 4, 4
d. 10, 30
```

5. Solve the following problem: (Marks: 05)

Write a python program that will ask user for his salary and will calculate his tax. The tax is based on your tax bracket as found from the first two columns below. Once you know which row to use, start with the "flat amount" and add the "plus %" of the amount over the amount listed in the final column. For example, if your income is $50,000$, then you use the third row of the table and compute the tax as $4,000$ plus 25% of the amount over $29,050$, which comes to $9,237.50$. The total tax on $27,500$ is $3,767.50$. For $6,000$, the tax is 600. For $120,000$, the tax is $28,227$. Assume your function is passed a $value \geq 0$.

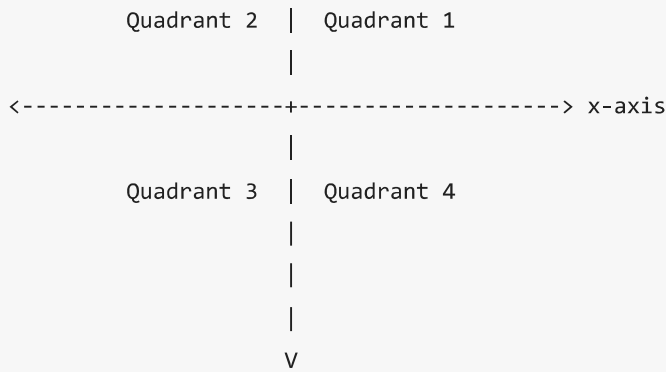| Over	But not over	Flat amount	Plus %	of excess over
$0	$7,150	$0	10%	$0
$7,150	$29,050	$715	15%	$7,150
$29,050	$72,250	$4,000	25%	$29,050
$72,250	unlimited	$14,250	28%	$72,250

6. Solve the following problem: (Marks: 05)

Take 2 real numbers from the user. The first number represents the x coordinate of a point and the second number represents the y coordinate of the point.

Write a program that will tell you in which quadrant the point lies. (Assume that the x and y axes are horizontal and vertical, respectively.)

```
                    ^ y-axis
                    |
                    |
                    |
```

```
        Quadrant 2  |  Quadrant 1
                    |
                    |
<-------------------+-------------------> x-axis
                    |
        Quadrant 3  |  Quadrant 4
                    |
                    |
                    |
                    V
```

If the point lies on the x-axis or y-axis, then print "The point lies on the x-axis" or "The point lies on the y-axis" respectively. If the point lies on the origin, then print "The point lies on the origin".

Sample Input:

```
Enter the x coordinate: 3
Enter the y coordinate: 4
```

Sample Output:

```
The point lies in Quadrant 1
```

7. Consider the following values for the variables x, y, z and b: (Marks: 05)

```
x = 27
y = -1
z = 32
b = False
```

Write the result of the following expressions:

```
not b and False
(x > y) and (y > z)
(x == y) or (x <= z)
not (x % 2 == 0)
y // y == 1
b and not b
(x < y) == b
not (x / 2 == 13) or b or (z * 3 == 96)
not ((x > 0) and (y < 0))
x * (y + 2) > y - (y + z) * 2
```