Programming Languages Assignment4

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Q1.

```python
import random

number = []
for i in range(200):
    x = random.randint(1,100)
    number.append(x)
number.sort()

arrupto20 = []
arrupto40 = []
arrupto60 = []
arrupto80 = []
arrupto100 = []
for i in range(len(number)):
    if number[i] >= 1 and number[i] <= 20:
        arrupto20.append('*')
    elif number[i] >= 21 and number[i] <= 40:
        arrupto40.append('*')
    elif number[i] >= 41 and number[i] <= 60:
        arrupto60.append('*')
    elif number[i] >= 61 and number[i] <= 80:
        arrupto80.append('*')
    elif number[i] >= 81 and number[i] <= 100:
        arrupto100.append('*')
str20 = ''.join(arrupto20)
str40 = ''.join(arrupto40)
str60 = ''.join(arrupto60)
str80 = ''.join(arrupto80)
str100 = ''.join(arrupto100)

for i in range(len(number)):
    print(f"{number[i]:4}", end="")
    if (i+1)%20 == 0:
        print()
print("-"*80)
print(" 1 -  20: ", str20, "  ", len(arrupto20))
print("21 -  40: ", str40, "  ", len(arrupto40))
print("41 -  60: ", str60, "  ", len(arrupto60))
print("61 -  80: ", str80, "  ", len(arrupto80))
print("81 - 100: ", str100, "  ", len(arrupto100))
```

A random library was used to receive random integer values between 1 and 100. I received 200 input values as a list(number variable) and arranged them in ascending order through the sort()method. Then, I created five arrays to meet the requirements of the problem, and for each of the 200 values in the number list. And, if the value is within the range of 1 to 20, add '*' to arrupto20, or if the value is within the range of 21 to 40, add '*' to arrupto40, or if the value is within the range of 41 to 60, add '*' to arrupto60,

or if the value is within the range of 61 to 80, and '*' to arrupto80, or if the value is within the range of 81 to 100, and '*' to arrupto100. After that, to represent the '*' values in the five arrays as a continuous string, I used join()method to combine the '*' values in array. So, I printed the number list and star-graph.

```
C:\Users\kksh3\OneDrive\바탕 화면\김서환\대학교 과제\소프트\Coding\Vscode\Python>python 2021312738_Assignment4_Q1.py
  1  1  1  2  2  2  2  3  3  3  3  4  4  5  5  6  6  6  7  9
  9  9 10 10 10 10 11 11 11 12 13 14 15 15 15 16 16 17 17 20
 21 21 23 25 25 25 25 26 27 27 27 27 27 28 30 31 32 32 32 33
 33 33 33 34 35 36 37 37 38 38 38 38 39 39 40 41 42 42 43 43
 44 44 45 46 47 47 48 48 49 50 51 51 51 51 51 52 53 53 53 54
 55 55 55 57 57 57 58 58 59 59 60 60 60 61 61 63 63 65 65 66
 67 67 67 67 68 68 68 68 69 70 70 70 71 71 71 72 72 73 73 73
 73 74 74 74 75 75 75 76 76 76 78 78 80 81 81 81 82 82 82 82
 82 83 83 83 84 84 84 84 85 85 85 86 86 86 87 87 87 89 89 90
 91 91 93 94 95 96 96 97 97 97 98 98 98 99 99 99 99 100 100 100
--------------------------------------------------------------------------------
 1 -  20:  ************************************    40
21 -  40:  *********************************    35
41 -  60:  ************************************    38
61 -  80:  ****************************************    40
81 - 100:  ************************************************    47

C:\Users\kksh3\OneDrive\바탕 화면\김서환\대학교 과제\소프트\Coding\Vscode\Python>python 2021312738_Assignment4_Q1.py
  1  1  1  1  2  3  4  4  4  5  6  7  8  8  8  9  9 10 10 10
 10 11 11 13 13 13 15 16 17 17 17 18 18 19 19 20 20 21 21 22
 22 23 23 23 23 23 23 24 24 24 25 25 25 26 26 27 29 30 30 30
 30 31 32 33 33 33 33 33 33 34 34 35 37 38 38 38 39 39 39 39
 40 40 41 42 44 44 44 45 46 46 46 46 48 48 48 49 49 49 49 50
 50 54 54 55 55 56 58 58 58 58 58 60 62 64 65 66 67 68 69 69
 70 70 71 71 72 73 74 74 74 74 75 75 75 75 75 76 76 77 77 78
 78 78 79 79 80 80 80 80 81 81 81 81 81 82 82 83 84 84 84 84
 85 86 86 86 86 87 87 90 91 91 91 91 92 93 93 93 93 94 94 94
 94 95 95 95 95 95 96 96 97 97 97 98 98 98 98 99 99 100 100 100
--------------------------------------------------------------------------------
 1 -  20:  ***********************************    37
21 -  40:  ********************************************    45
41 -  60:  ****************************    30
61 -  80:  ***********************************    36
81 - 100:  ************************************************    52
```

Q2.

```python
def recursivesum(n):
    if n == 1:
        return 0
    else:
        return n-1 + recursivesum(n-1)

inp = input("Insert a number n or \"Exit\": ")
if inp.isdigit():
    n = int(inp)
    result = recursivesum(n)
    print("the sum will be :", result)
```

I wrote the input text so that user could insert n or Exit, and if the input was a number (integer), I ran the recursivesum() function (recursive function) and added all the numbers before n and assign them as the result variable. So, I printed the sum of the numbers before n(user input)

```
C:\Users\kksh3\OneDrive\바탕 화면\김서환\대학교 과제\소프트\Coding\Vscode\Python>python 2021312738_Assignment4_Q2.py
Insert a number n or "Exit": 5
the sum will be : 10

C:\Users\kksh3\OneDrive\바탕 화면\김서환\대학교 과제\소프트\Coding\Vscode\Python>python 2021312738_Assignment4_Q2.py
Insert a number n or "Exit": 9
the sum will be : 36

C:\Users\kksh3\OneDrive\바탕 화면\김서환\대학교 과제\소프트\Coding\Vscode\Python>python 2021312738_Assignment4_Q2.py
Insert a number n or "Exit": 100
the sum will be : 4950
```

Q3.

```python
def isPrime(n):
    if n == 1:
        return False
    for i in range(2, int(n**(1/2))+1):
        if n%i == 0:
            return False
    return True

rank = int(input("What is the prime number at rank: "))
count = 0
digit = 0
while (count < rank):
    digit += 1
    if isPrime(digit):
        count += 1
print("The prime number is", digit)
```

I got the rank as input. Sieve of Eratosthenes was used to create an isPrime() function to determine if it is prime when a number is given, and whenever I found a prime number, I increased the value of the count variable by one. I compared rank and count through the while statement to find the prime number corresponding to the rank input. So I found the prime number corresponding to the rank input.

```
C:\Users\kksh3\OneDrive\바탕 화면\김서환\대학교 과제\소프트\Coding\Vscode\Python>python 2021312738_Assignment4_Q3.py
What is the prime number at rank: 6
The prime number is 13

C:\Users\kksh3\OneDrive\바탕 화면\김서환\대학교 과제\소프트\Coding\Vscode\Python>python 2021312738_Assignment4_Q3.py
What is the prime number at rank: 10
The prime number is 29

C:\Users\kksh3\OneDrive\바탕 화면\김서환\대학교 과제\소프트\Coding\Vscode\Python>python 2021312738_Assignment4_Q3.py
What is the prime number at rank: 1
The prime number is 2

C:\Users\kksh3\OneDrive\바탕 화면\김서환\대학교 과제\소프트\Coding\Vscode\Python>python 2021312738_Assignment4_Q3.py
What is the prime number at rank: 2
The prime number is 3

C:\Users\kksh3\OneDrive\바탕 화면\김서환\대학교 과제\소프트\Coding\Vscode\Python>python 2021312738_Assignment4_Q3.py
What is the prime number at rank: 3
The prime number is 5

C:\Users\kksh3\OneDrive\바탕 화면\김서환\대학교 과제\소프트\Coding\Vscode\Python>python 2021312738_Assignment4_Q3.py
What is the prime number at rank: 15
The prime number is 47
```