

## Practice exercises: Week 4 (Loops : while and for loops)

1. Write code that accepts a sentence as input and print number of alphabets in uppercase, lowercase, and numbers in the given input . Sample run here:

```
Enter the sentence that with alphabets and numbers:LUT University Lahti has 2 campuses
Number of alphabets in uppercase: 5
Number of alphabets in lowercase: 24
Number of digits: 1
```

**Suggested answer:**

```
str=input("Enter an english sentence:")
count_upper=0
count_lower=0
count_digit=0
for s in str:
    if s.isupper():count_upper+=1
    elif s.islower():count_lower+=1
    elif s.isdigit():count_digit+=1
print("The number of uppercase:",count_upper)
print("The number of lowercase:",count_lower)
print("The number of digit:",count_digit)
```

```
1 str=input("Enter an english sentence:")
2 count_upper=0
3 count_lower=0
4 count_digit=0
5 for s in str:
6     if s.isupper():count_upper+=1
7     elif s.islower():count_lower+=1
8     elif s.isdigit():count_digit+=1
9 print("The number of uppercase:",count_upper)
10 print("The number of lowercase:",count_lower)
11 print("The number of digit:",count_digit)
```

2. Write a program that accepts any positive integer number as input (n) and print the sum of odd and even numbers are in between 1 and n. Sample run is here. [Try both for and while loops]

```
Enter n value (>=1 atleast):6
The running result of for loop:
Sum of odd numbers: 9
Sum of even numbers: 12
The running result of while loop:
Sum of odd numbers: 9
Sum of even numbers: 12
```

The above results were obtained based on numbers in between 1 and 6 (n). That is, sum of odd

numbers:  $1+3+5=9$  and even numbers:  $2+4+6=12$ . one more here

```
Enter an integer(>=1):1
The running result of for loop:
Sum of all odd: 1
Sum of all odd: 0
The running result of while loop:
Sum of all odd: 1
Sum of all odd: 0
```

**Suggested answer:**

```
n=int(input("Enter an integer(>=1):"))
sum_odd=0
sum_even=0
for i in range(1,n+1):
    if i%2==1:
        sum_odd=sum_odd+i
    else:
        sum_even=sum_even+i
print("The running result of for loop:")
print("Sum of all odd:",sum_odd)
print("Sum of all odd:",sum_even)
sum_odd=0
sum_even=0
i=1
while(i<=n):
    if i%2==1:
        sum_odd+=i
    else:
        sum_even+=i
    i+=1
print("The running result of while loop:")
print("Sum of all odd:",sum_odd)
print("Sum of all odd:",sum_even)
```

```

1 n=int(input("Enter an integer(>=1):"))
2 sum_odd=0
3 sum_even=0
4 for i in range(1,n+1):
5     if i%2==1:
6         sum_odd=sum_odd+i
7     else:
8         sum_even=sum_even+i
9 print("The running result of for loop:")
10 print("Sum of all odd:",sum_odd)
11 print("Sum of all even:",sum_even)
12 sum_odd=0
13 sum_even=0
14 i=1
15 while(i<=n):
16     if i%2==1:
17         sum_odd+=i
18     else:
19         sum_even+=i
20     i+=1
21 print("The running result of while loop:")
22 print("Sum of all odd:",sum_odd)
23 print("Sum of all even:",sum_even)

```

3.

Write code that accepts n number of positive numbers as input and that should be continued until the user enters -1 (termination user input). Then it should print the smallest, biggest and average of those values at the end. Example run is here:

```

''' python ex3_p.py
Enter a non-negative integer.Enter -1 to terminate input process.
Enter a value:4
Enter a value:2
Enter a value:-3
Enter a value:8
Enter a value:5
Enter a value:-1
Smallest number : -3
Biggest number: 8
average of all numbers: 3.2

```

one more sample run is here:

```

Enter a non-negative integer.If you enter -1, input ends.
Input data:-1
No valid input.

```

**Suggested answer:**

```

count=0
total=0
print("Enter a non-negative integer.If you enter -1, input ends.")
num=int(input("Input data:"))
min=num
max=num
while(num!=-1):

```

```

    count+=1
    total+=num
    if num<min:min=num
    if num>max:max=num
    num=int(input("Input data:"))
if count>0:
    print("min data:",min)
    print("max data:",max)
    print("average value:",total/count)
else:
    print("No valid input.")

```

```

1 count=0
2 total=0
3 print("Enter a non-negative integer.If you enter -1, input ends.")
4 num=int(input("Input data:"))
5 min=num
6 max=num
7 while(num!=-1):
8     count+=1
9     total+=num
10    if num<min:min=num
11    if num>max:max=num
12    num=int(input("Input data:"))
13 if count>0:
14     print("min data:",min)
15     print("max data:",max)
16     print("average value:",total/count)
17 else:
18     print("No valid input.")

```

4. Write a program that accpets any integer as input and print whether it is a prime number or not. Prime number is a natural which is greater than one. Notably, it can be divided by 1 and itself. That is, the number which can not be divided by other integers. Example 7 → it can be divided by 1 and itself.

**Suggested answer:**

**#use break**

```

n=int(input("Enter an integer(>=2):"))
for i in range(2,n):
    if n%i==0:break
if n==2:
    print(n,"is a prime number.")
elif i==n-1:
    print(n,"is a prime number.")
else:
    print(n,"is not a prime number.")

```

```

1 #use break
2 n=int(input("Enter an integer(>=2):"))
3 for i in range(2,n):
4     if n%i==0:break
5 if n==2:
6     print(n,"is a prime number.")
7 elif i==n-1:
8     print(n,"is a prime number.")
9 else:
10    print(n,"is not a prime number.")

```

**#use else-segement**

```

n=int(input("Enter an integer(>=2):"))
for i in range(2,n):
    if n%i==0:
        print(n,"is not a prime number.")
        break
else:
    print(n,"is a prime number.")

```

```

1 #use else-segement
2 n=int(input("Enter an integer(>=2):"))
3 for i in range(2,n):
4     if n%i==0:
5         print(n,"is not a prime number.")
6         break
7 else:
8     print(n,"is a prime number.")

```

5. Use the for loop to print the figure shown as follows.

```

★
★★
★★★
★★★★
★★★★★
★★★★★
★★★★★
★★★★
★★★
★★
★

```

**Suggested answer:**

```

for m in range(1,5+1):
    for i in range(1,m+1):
        print("*",end="")
    print()

```

```

for m in range(1,5+1):
    for i in range(1,6-m+1):
        print("*",end="")
    print()

```

```

1 for m in range(1,5+1):
2     for i in range(1,m+1):
3         print("*",end="")
4     print()
5 for m in range(1,5+1):
6     for i in range(1,6-m+1):
7         print("*",end="")
8     print()

```

6. A positive integer is called a perfect number if it is equal to the sum of all of its positive divisors, excluding itself. For example, 6 is the first perfect number because  $6 = 3 + 2 + 1$ . The next is  $28 = 14 + 7 + 4 + 2 + 1$ . There are four perfect numbers less than 10000. Write a program to find all these four numbers.

**Suggested answer:**

```

for n in range(1,10000):
    sum=0
    for i in range(1,n):
        if n%i==0:
            sum+=i
    if sum==n:
        print(n)

```

```

1 for n in range(1,10000):
2     sum=0
3     for i in range(1,n):
4         if n%i==0:
5             sum+=i
6     if sum==n:
7         print(n)

```