Task 1: Write a program that asks the user about the number of values he/she wants to enter. Than enter the values as per the required number, calculate its sum and identify the smallest value among them. The sample output is as follow:

In [25]:
```
num_values = int(input("Enter the number of values: "))
values = []

for i in range(num_values):
    value = float(input(f"Enter value {i+1}: "))
    values.append(value)

sum_values = sum(values)
smallest_value = min(values)

print("Sum of the values: ", sum_values)
print("Smallest value: ", smallest_value)
```

```
Enter the number of values: 5
Enter value 1: 3
Enter value 2: 2
Enter value 3: 5
Enter value 4: 6
Enter value 5: 7
Sum of the values:  23.0
Smallest value:  2.0
```

Task 2: The factorial function is used frequently in probability problems. The factorial of a positive integer n (written n! and pronounced “n factorial”) is equal to the product of the positive integers from 1 to n. Write a function factorial that accepts an integer as parameter and returns its factorial. Using the factorial function, write a program that evaluates the factorials of the integers from 1 to 5. Print the results in tabular format as following

In [34]:
```
def factorial(n):
    if n == 0 or n == 1:
        return 1
    else:
        return n * factorial(n - 1)

print("Number\tFactorial")
for i in range(1, 6):
    result = factorial(i)
    print("{}\t{}".format(i, result))
```

```
Number  Factorial
1       1
2       2
3       6
4       24
5       120
```

Task 3: Write a program that plays an incredibly stupid number-guessing game. The user will try to guess the secret number until they get it right. That means it will keep looping as long as the guess is different from the secret number. You must store the secret number in a variable, and use that variable throughout. The secret number itself must not appear in the program at all, except in the one line where you store it into a variable. Sample output is as following:

In [14]:
```python
import random
secret_number = random.randint(1,20)

print("Welcome to the random stupid guessing game")
print("I'm guessing a random number 1 and 20")

while True:
    guess=int(input("take a guess:"))

    if guess == secret_number:
        print("congratulations! you guessed the secret number.")
        break
    else:
        print("Nope it's not the correct, guess again")
```

```
Welcome to the random stupid guessing game
I'm guessing a random number 1 and 20
take a guess:2
Nope it's not the correct, guess again
take a guess:1
Nope it's not the correct, guess again
take a guess:4
Nope it's not the correct, guess again
take a guess:3
Nope it's not the correct, guess again
take a guess:5
Nope it's not the correct, guess again
take a guess:11
Nope it's not the correct, guess again
take a guess:10
Nope it's not the correct, guess again
take a guess:12
Nope it's not the correct, guess again
take a guess:13
Nope it's not the correct, guess again
take a guess:20
Nope it's not the correct, guess again
take a guess:16
Nope it's not the correct, guess again
take a guess:17
Nope it's not the correct, guess again
take a guess:15
Nope it's not the correct, guess again
take a guess:16
Nope it's not the correct, guess again
take a guess:17
Nope it's not the correct, guess again
take a guess:18
Nope it's not the correct, guess again
take a guess:19
Nope it's not the correct, guess again
take a guess:6
Nope it's not the correct, guess again
take a guess:7
Nope it's not the correct, guess again
take a guess:8
Nope it's not the correct, guess again
take a guess:9
congratulations! you guessed the secret number.
```

Task 4:The greatest common divisor (GCD) of two integers is the largest integer that evenly divides each of the two numbers. Write function gcd that returns the greatest common divisor of two integers. Use the gcd function in your program to determine the GCD of the numbers in the sample output:

In [17]:
```python
def gcd(a, b):
    while b != 0:
        a, b = b, a % b
    return a

num1 = 48
```

```
num2 = 36

result = gcd(num1, num2)
print("The GCD of", num1, "and", num2, "is", result)
```

```
The GCD of 48 and 36 is 12
```

Task 5: An integer is said to be prime if it is divisible only by 1 and itself. For example, 2, 3, 5 and 7 are prime, but 4, 6, 8 and 9 are not.a) Write a function that determines if a number is prime. b) Use this function in a program that determines and prints all the prime numbers between 1 and 10,000

In [18]:
```
def is_prime(num):
    if num <= 1:
        return False
    for i in range(2, int(num**0.5) + 1):
        if num % i == 0:
            return False
    return True

print("Prime numbers between 1 and 10,000:")
for number in range(1, 10001):
    if is_prime(number):
        print(number)
```

```
Prime numbers between 1 and 10,000:
2
3
5
7
11
13
17
19
23
29
31
37
41
43
47
53
59
61
67
71
73
79
83
89
97
101
103
107
109
113
127
131
137
139
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151
157
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167
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283
293
307
```

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683
691
701
709

719
727
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743
751
757
761
769
773
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797
809
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863
877
881
883
887
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937
941
947
953
967
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991
997
1009
1013
1019
1021
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1103
1109
1117
1123
1129
1151
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9857
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9871
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9901
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9973
```

Task 6: Write a code that prints on screen all the 4-digit Armstrong numbers.

In [20]:
```
for number in range(1000, 10000):
    sum_of_powers = 0
    temp = number
    while temp > 0:
        digit = temp % 10
        sum_of_powers += digit ** 4
        temp //= 10
    if sum_of_powers == number:
        print(number)
```

```
1634
8208
9474
```

Task 7: Write a program that outputs 100 lines, numbered 1 to 100, each with your name on it. The output should look like the output below:

In [4]:
```
for i in range (101):
    print(i+1,"Noor Baig")
```

1 Noor Baig
2 Noor Baig
3 Noor Baig
4 Noor Baig
5 Noor Baig
6 Noor Baig
7 Noor Baig
8 Noor Baig
9 Noor Baig
10 Noor Baig
11 Noor Baig
12 Noor Baig
13 Noor Baig
14 Noor Baig
15 Noor Baig
16 Noor Baig
17 Noor Baig
18 Noor Baig
19 Noor Baig
20 Noor Baig
21 Noor Baig
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64 Noor Baig

```
65 Noor Baig
66 Noor Baig
67 Noor Baig
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91 Noor Baig
92 Noor Baig
93 Noor Baig
94 Noor Baig
95 Noor Baig
96 Noor Baig
97 Noor Baig
98 Noor Baig
99 Noor Baig
100 Noor Baig
101 Noor Baig
```

Task 8: Write a program that prints out a list of the integers from 1 to 20 and their squares. The output should look like this:

In [21]:

```python
print("Number  Square")
print("--------------")

for number in range(1, 21):
    square = number ** 2
    print(f"{number:6}  {square:6}")
```

```
Number  Square
--------------
     1       1
     2       4
     3       9
     4      16
     5      25
     6      36
     7      49
     8      64
     9      81
    10     100
    11     121
    12     144
    13     169
    14     196
    15     225
    16     256
    17     289
    18     324
    19     361
    20     400
```

Task 9: Write a program that uses a for loop to print the numbers 8, 11, 14, 17, 20, . . . , 83, 86, 89.

In [22]:
```
for num in range(8, 90, 3):
    print(num)
```

```
8
11
14
17
20
23
26
29
32
35
38
41
44
47
50
53
56
59
62
65
68
71
74
77
80
83
86
89
```

Task 10: Write a program that asks the user for their name and how many times to print it. The program

should print out the user's name the specified number of times.

In [23]:
```
name = input("Enter your name: ")
times = int(input("Enter the number of times to print your name: "))

for i in range(times):
    print(name)
```

```
Enter your name: Noor Baig
Enter the number of times to print your name: 100
Noor Baig
Noor Baig
Noor Baig
Noor Baig
Noor Baig
Noor Baig
Noor Baig
Noor Baig
Noor Baig
Noor Baig
Noor Baig
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Noor Baig
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```

Task 11: Use a for loop to print a box like the one below. Allow the user to specify how wide and how high the box should be.

In [24]:

```
width = int(input("Enter the width of the box: "))
height = int(input("Enter the height of the box: "))

for i in range(height):
    if i == 0 or i == height - 1:
        print("*" * width)
    else:
        print("*" + " " * (width - 2) + "*")
```

```
Enter the width of the box: 5
Enter the height of the box: 6
*****
*   *
*   *
*   *
*   *
*****
```

Task 12: Use a for loop to print a triangle like the one below. Allow the user to specify how high the triangle should be.

In [26]:
```
height = int(input("Enter the height of the triangle: "))

for i in range(height):
    print(" " * (height - i - 1) + "*" * (2*i + 1))
```

```
Enter the height of the triangle: 5
    *
   ***
  *****
 *******
*********
```

Task 13: Use for loops to print a diamond like the one below. Allow the user to specify how high the diamond should be.

In [28]:
```
height = int(input("Enter the height of the diamond: "))

# Upper half of the diamond
for i in range(height):
    print(" " * (height - i - 1) + "*" * (2 * i + 1))

# Lower half of the diamond
for i in range(height - 2, -1, -1):
    print(" " * (height - i - 1) + "*" * (2 * i + 1))
```

```
Enter the height of the diamond: 6
     *
    ***
   *****
  *******
 *********
***********
 *********
  *******
   *****
    ***
     *
```

Task 14: Write a program that prints a giant letter A like the one below. Allow the user to specify how large the letter should be.

In [1]:
```
n = int(input("How high the letter A: "))
for i in range(n):
    for j in range (i,n):
        print(" ",end='')
```

```
        if (i==n or j==0)or i==n//2:
            print("*",end='')
        else:
            print(" ",end='')

    for j in range(i+1):
        if (i==n or j==i) or i==n//2:
            print("*",end='')

        else:
            print(" ",end='')

    print()
print()
```

```
How high the letter A: 13
             *
            * *
           *   *
          *     *
         *       *
        *         *
       *           *
      *************
     *             *
    *               *
   *                 *
  *                   *
 *                     *
```

In [ ]: