1. Write a program to calculate the distance between two points.

d = sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}

```python
from math import sqrt

#List to store the points
points = []

#Prompts for the inputs
inpts = ["Enter x1: ", "Enter y1: ", "Enter x2: ", "Enter y2: "]

#Taking inputs using a for loop
for inpt in inpts:
    points.append(float(input(inpt)))

#Unpacking the points
x1, y1, x2, y2 = points

print("X1 point:", x1)
print("Y1 point:", y1)
print("X2 point:", x2)
print("Y2 point:", y2)

#Calculating the distance
d = sqrt((x2 - x1)**2 + (y2 - y1)**2)
print("Distance:", d)
```

```
Enter x1: 1
Enter y1: 1
Enter x2: 3
Enter y2: 3
X1 point: 1.0
Y1 point: 1.0
X2 point: 3.0
Y2 point: 3.0
Distance: 2.8284271247461903
```

2. Write a program to calculate the area of a triangle using Heron's formula.

What is Herons Formula?

Heron's formula is a formula used to calculate the area of the triangle, when the length of all the three sides are given. The Hero's formula is given by:

Area of triangle = √[s(s-a)(s-b)(s-c)]

where a,b and c are the lengths of sides of triangle

and s is the semi-perimeter of triangle

s = (a+b+c)/2

In [31]:
```python
from math import sqrt  #Import the square root function from the math module

#List to store the sides of the triangle
sides = []

#Prompts for the inputs
inpts = ["Enter 1st side: ", "Enter 2nd side: ", "Enter 3rd side: "]

#Taking inputs using a for loop
for inpt in inpts:
    sides.append(float(input(inpt)))  #Append each input to the sides list as a flo

#Unpacking the sides list into individual variables
a, b, c = sides

#Print the entered sides for verification
print("\t")
print("1st side:", a)
print("2nd side:", b)
print("3rd side:", c)
print("\t")

#Calculate the semi-perimeter of the triangle
s = (a + b + c) / 2
print("S of given triangle is:", s)
print()

#Calculate the value inside the square root for Heron's formula
value_inside_sqrt = s * (s - a) * (s - b) * (s - c)

#Check if the value inside the square root is non-negative
if value_inside_sqrt >= 0:
    #Calculate the area of the triangle using Heron's formula
    AOT = sqrt(value_inside_sqrt)
    print("Area of triangle:", AOT)
else:
    #Print an error message if the value inside the square root is negative
    print("Error: The value inside the square root is negative, which is not allowe
```

```
Enter 1st side: 2
Enter 2nd side: 5
Enter 3rd side: 5

1st side: 2.0
2nd side: 5.0
3rd side: 5.0

S of given triangle is: 6.0

Area of triangle: 4.898979485566356
```

3. Write a program to calculate the bill amount for an item given its quantity sold, value, discount, and tax.

3.a

Given a string s = "1234" and an integer n = 5678, concatenate them as a single string and then convert the result back to an integer. What is the final integer value?

```python
#Initialize an empty list to store input values
values = []

#List of prompts for user input
inpts = ["Enter the amount value: ", "Enter the Quantity: ", "Enter the discount in

#Loop through each prompt and append the user input to the values list
for inpt in inpts:
    values.append(float(input(inpt)))

#Unpack the values list into individual variables
amnt, qnty, discnt, tax = values

#Print the entered values for verification
print()
print("Amount value:", amnt)
print("Quantity:", qnty)
print("Discount:", discnt)
print("Tax:", tax)

#Calculate the total price before discount and tax
price = amnt * qnty

#Calculate the discount amount
dis_amnt = (price * discnt) / 100

#Calculate the price after applying the discount
after_dis = price - dis_amnt

#Calculate the tax amount on the discounted price
tax_amnt = (after_dis * tax) / 100

#Calculate the final price after applying both discount and tax
after_tax = after_dis + tax_amnt

#Print the calculated amounts
print()
print("Discount amount:", dis_amnt)
print("Amount after the discount:", after_dis)
print("Tax amount:", tax_amnt)
print("Total Price after the tax and discount:", after_tax)
```

```
Enter the amount value: 100
Enter the Quantity: 2
Enter the discount in %: 18
Enter the Tax in %: 18

Amount value: 100.0
Quantity: 2.0
Discount: 18.0
Tax: 18.0

Discount amount: 36.0
Amount after the discount: 164.0
Tax amount: 29.52
Total Price after the tax and discount: 193.52
```

3.(a) Given a string s = "1234" and an integer n = 5678, concatenate them as a single string and then convert the result back to an integer. What is the final integer value?

In [9]:
```python
s = "1234"
n = 5678

#Step 1: Concatenate the string and the integer
concatenated_result = s + str(n)

#Step 2: Convert the concatenated result back to an integer
final_integer = int(concatenated_result)

print(final_integer)
```

```
12345678
```

4. Given two variables, a = 7 and b = 3, write a Python code snippet to swap their values without using a temporary variable. What will be the values of a and b after the swap?

In [19]:
```python
a = 7
b = 3
c = [a, b]

#Print the list
print("List:", c)

#Concatenate the list elements into a single string and reverse it
result = ''.join(map(str, c))
reversed_result = result[::-1]

#Print the results
print("Concatenated String:", result)
print("Reversed String:", reversed_result)
```

```
List: [7, 3]
Concatenated String: 73
Reversed String: 37
```

5. Given a list of numbers = [10, 20, 30, 40, 50], write a Python code snippet to calculate the average of these numbers using arithmetic operators.

```
In [29]: #List of numbers
         a = [10, 20, 30, 40, 50]

         #Variable to store the sum of the numbers
         sum = 0

         #Loop through each number in the list
         for i in a:
             #Add the current number to the sum
             sum += i

         #Calculate the average by dividing the sum by the number of elements
         average = sum / len(a)

         #Print the total sum of the numbers
         print("Sum:", sum)

         #Print the average of the numbers
         print("Average:", average)
```

```
Sum: 150
Average: 30.0
```

6. Write a simple basic calculator program in python.Direction:

```
In [32]: #Define functions for each arithmetic operation
         def add(x, y):
             return x + y

         def subtract(x, y):
             return x - y

         def multiply(x, y):
             return x * y

         def divide(x, y):
             if y != 0:
                 return x / y
             else:
                 return "Error! Division by zero."

         #Display the menu of operations
         print("Select operation:")
         print("1. Add")
         print("2. Subtract")
         print("3. Multiply")
```

```python
print("4. Divide")

#Take input from the user
choice = input("Enter choice (1/2/3/4): ")

#Check if the choice is valid
if choice in ['1', '2', '3', '4']:
    num1 = float(input("Enter first number: "))
    num2 = float(input("Enter second number: "))

    if choice == '1':
        print(f"{num1} + {num2} = {add(num1, num2)}")

    elif choice == '2':
        print(f"{num1} - {num2} = {subtract(num1, num2)}")

    elif choice == '3':
        print(f"{num1} * {num2} = {multiply(num1, num2)}")

    elif choice == '4':
        print(f"{num1} / {num2} = {divide(num1, num2)}")

else:
    print("Invalid input")
```

```
Select operation:
1. Add
2. Subtract
3. Multiply
4. Divide
Enter choice (1/2/3/4): 2
Enter first number: 100
Enter second number: 20
100.0 - 20.0 = 80.0
```

In [ ]: