1. Write a program that calculates and prints the value according to the given formula:

Q = Square root of [(2 C D)/H]

Following are the fixed values of C and H:

C is 50. H is 30.

D is the variable whose values should be input to your program in a comma-separated sequence.

Example

Let us assume the following comma separated input sequence is given to the program:

100,150,180

The output of the program should be:

18,22,24

```python
In [1]: import math

        # fixed values of C and H
        C = 50
        H = 30

        # take input of comma-separated values of D
        d_values = input("Enter values of D (comma-separated): ")

        # convert comma-separated input string into a list of integers
        d_values_list = [int(i) for i in d_values.split(',')]

        # iterate over the list of D values and calculate Q for each value
        for d in d_values_list:
            Q = math.sqrt((2 * C * d) / H)
            print(round(Q), end=',')
```

```
Enter values of D (comma-separated): 43
12,
```

2. Write a program which takes 2 digits, X,Y as input and generates a 2-dimensional array. The element value in the i-th row and j-th column of the array should be i*j.

```python
In [2]: # Take input for X and Y
        X = int(input("Enter the value for X: "))
        Y = int(input("Enter the value for Y: "))

        # Create an empty 2D array
        array_2d = []

        # Loop through rows and columns and calculate i*j for each element
        for i in range(X):
            row = []
            for j in range(Y):
                row.append(i*j)
            array_2d.append(row)

        # Print the 2D array
        for row in array_2d:
            print(row)
```

```
Enter the value for X: 89
Enter the value for Y: 71
[0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29,
30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57,
58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70]
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, 87, 90, 93, 96, 99, 102, 105, 108, 111, 114, 117, 120, 123, 126, 129, 132, 135, 138, 141, 144, 147, 150, 153,
156, 159, 162, 165, 168, 171, 174, 177, 180, 183, 186, 189, 192, 195, 198, 201, 204, 207, 210]
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5104, 5192, 5280, 5368, 5456, 5544, 5632, 5720, 5808, 5896, 5984, 6072, 6160]

3. Write a program that accepts a comma separated sequence of words as input and prints the words in a comma-separated sequence after sorting them alphabetically.

4. Write a program that accepts a sequence of whitespace separated words as input and prints the words after removing all duplicate words and sorting them alphanumerically.

```
In [4]:   user_input = input("Enter a sequence of whitespace-separated words: ")

          # Split the input string into a list of words
```

```python
words = user_input.split()

# Remove duplicate words
unique_words = list(set(words))

# Sort the words alphabetically
sorted_words = sorted(unique_words)

# Print the sorted words
print(" ".join(sorted_words))
```

```
Enter a sequence of whitespace-separated words: 38
38
```

. Write a program that accepts a sentence and calculate the number of letters and digits.

In [5]:
```python
sentence = input("Enter a sentence: ")

letters = 0
digits = 0

for char in sentence:
    if char.isalpha():
        letters += 1
    elif char.isdigit():
        digits += 1

print("Number of letters:", letters)
print("Number of digits:", digits)
```

```
Enter a sentence: MYNAME IS HIMANSHU
Number of letters: 16
Number of digits: 0
```

6. A website requires the users to input username and password to register. Write a program to check the validity of password input by users.

In [7]:
```python
import re

def validate_password(password):
    # Check length
    if len(password) < 8:
        return False
    # Check for at least one lowercase letter
    if not re.search("[a-z]", password):
        return False
    # Check for at least one uppercase letter
    if not re.search("[A-Z]", password):
        return False
    # Check for at least one digit
    if not re.search("[0-9]", password):
        return False
    # If all checks pass, password is valid
    return True
```

In [ ]: