1. Take two strings as input and concatenate them.
2. Write a python program to detect double spaces in a string and replace it with a single space.
3. Write a program to extract the substring "Python" from "Welcome to Python Programming".
4. Write a program that checks if a given string is a palindrome. Take input from the user.
5. Write a program that takes an input from the user and prints its data type.
6. Write a Python program to print the following pattern using escape sequences:

```
"Python"
is
awesome!
```

7. Write a program to count the number of vowels in a given string.
8. Write a Python program that replaces all occurrences of "a" with "@" in a given string.
9. Write a program to reverse a string using slicing.
10. Write a program to perform all arithmetic operations (+, -, *, /, %) on two numbers provided by the user.
11. Write a Python program to count the occurrence of each character in a string.
12. Write a Python program that converts all lowercase letters to uppercase and vice versa in a string.
13. Write a Python program to check if a given string is alphanumeric.
14. Write a function that takes a string as input and returns the longest word in the string. If there are multiple words of the same length, return the one that appears first. Ignore punctuation and special characters.

    Example:

    - Input: "Python is an amazing programming language!"
    - Output: "programming"

15. Write a program to count how many times each word appears in a sentence.

16. Write a program to align a string at the center, padding it with a specified character provided by the user. The padding character should be applied equally on both sides, and if the total length is not even, the extra padding should be added to the right.

    Example:

    string = "Hello"

    padding_char = "*"

    total_length = 20

    The output should center the string "Hello" within a 20-character wide string, using

17. Write a program that validates a password based on the following criteria:

    - At least 8 characters long.
    - Contains at least one uppercase letter.
    - Contains at least one lowercase letter.
    - Contains at least one digit.
    - Contains at least one special character (e.g., !@#$%^&*).

18. Write a program to check if one string is a rotation of another string. For example, the string "abcde" is a rotation of "cdeab". The program should check if two strings are rotations of each other without using any functions.

19. Write a program that compresses a string by using the counts of consecutive repeated characters. For example, the input "aaabbcccc" should be compressed to "a3b2c4". The program should iterate over the string and compress it manually without using any functions.

20. Write a Python program to create an advanced calculator that can perform addition, subtraction, multiplication, division between two numbers. The program should format the output to make it easy to read.