Assignment # 03

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Due Date: 05-07-2023

1. Write a program that takes a list of numbers as input and prints the even numbers in the list using a for loop.

Example:

Input: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]

Output: 2 4 6 8 10

Source Code:

```
void main() {
  List<int> numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10];

  print("Input: $numbers");
  print("Output:");

  for (int number in numbers) {
    if (number % 2 == 0) {
      print(number);
    }
  }
}
```

Output:

```
flutter: Input: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
flutter: Output:
flutter: 2
flutter: 4
flutter: 6
flutter: 8
flutter: 10
```

2. Write a program that prints the Fibonacci sequence up to a given number using a for loop.

Example:

Input: 10

Output: 0 1 1 2 3 5 8

Source Code:

```
void main() {
  int limit = 10;

  print("Input: $limit");
  print("Output:");

  int firstNumber = 0;
  int secondNumber = 1;

  print(firstNumber);
  print(secondNumber);

  for (int i = 2; i <= limit; i++) {
    int nextNumber = firstNumber + secondNumber;
    print(nextNumber);

    firstNumber = secondNumber;
    secondNumber = nextNumber;
  }
}
```

Output:

```
flutter: Input: 10
flutter: Output:
flutter: 0
flutter: 1
flutter: 2
flutter: 3
flutter: 5
flutter: 8
flutter: 13
flutter: 21
flutter: 34
flutter: 55
```

3. Implement a code that checks whether a given number is prime or not.

Example:

Input: 17

Output: 17 is a prime number.

Source Code:

```
void main() {
  int number = 17;

  print("Input: $number");
  print("Output:");

  bool isPrime = true;

  if (number <= 1) {
    isPrime = false;
  } else {
    for (int i = 2; i <= number / 2; i++) {
      if (number % i == 0) {
        isPrime = false;
        break;
      }
    }
  }

  if (isPrime) {
    print("$number is a prime number.");
  } else {
    print("$number is not a prime number.");
  }
}
```

Output:

```
flutter: Input: 17
flutter: Output:
flutter: 17 is a prime number.
```

4. Implement a code that finds the factorial of a number using a while loop or for loop.

Example:

Input: 5

Output: Factorial of 5 is 120

Source Code:

```
void main() {
  int number = 5;

  print("Input: $number");
```

```
  print("Output:");

  int factorial = 1;

  for (int i = 1; i <= number; i++) {
    factorial *= i;
  }

  print("Factorial of $number is $factorial");
}
```

Output:

```
flutter: Input: 5
flutter: Output:
flutter: Factorial of 5 is 120
```

5. Write a program that calculates the sum of all the digits in a given number using a while loop.

Example:

Input: 12345

Output: Sum of digits: 15

Source Code:

```
void main() {
  int number = 12345;

  print("Input: $number");
  print("Output:");

  int sum = 0;
  int remainder;

  while (number != 0) {
    remainder = number % 10;
    sum += remainder;
    number = number ~/ 10;
  }

  print("Sum of digits: $sum");
}
```

Output:

```
flutter: Input: 12345
flutter: Output:
flutter: Sum of digits: 15
```

6. Implement a code that finds the largest element in a list using a for loop.

Example:

Input: [3, 9, 1, 6, 4, 2, 8, 5, 7]

Output: Largest element: 9

Source Code:

```
void main() {
  List<int> numbers = [3, 9, 1, 6, 4, 2, 8, 5, 7];

  print("Input: $numbers");
  print("Output:");

  int largest = numbers[0];

  for (int i = 1; i < numbers.length; i++) {
    if (numbers[i] > largest) {
      largest = numbers[i];
    }
  }

  print("Largest element: $largest");
}
```

Output:

```
flutter: Input: [3, 9, 1, 6, 4, 2, 8, 5, 7]
flutter: Output:
flutter: Largest element: 9
```

7. Write a program that prints the multiplication table of a given number using a for loop.

Example:

Input: 5

Output:

5 x 1 = 5

5 x 2 = 10

5 x 3 = 15

...

5 x 10 = 50

Source Code:

```
void main() {
  int number = 5;

  print("Input: $number");
  print("Output:");

  for (int i = 1; i <= 10; i++) {
    int product = number * i;
    print("$number x $i = $product");
  }
}
```

Output:

```
flutter: Input: 5
flutter: Output:
flutter: 5 x 1 = 5
flutter: 5 x 2 = 10
flutter: 5 x 3 = 15
flutter: 5 x 4 = 20
flutter: 5 x 5 = 25
flutter: 5 x 6 = 30
flutter: 5 x 7 = 35
flutter: 5 x 8 = 40
flutter: 5 x 9 = 45
flutter: 5 x 10 = 50
```

8. Implement a function that checks if a given string is a palindrome.

Example:

Input: "radar"

Output: "radar" is a palindrome.

Source Code:

```
void main() {
  String input = "radar";

  print("Input: $input");
  print("Output:");

  bool isPalindrome = checkPalindrome(input);
```

```
  if (isPalindrome) {
    print("$input is a palindrome.");
  } else {
    print("$input is not a palindrome.");
  }
}

bool checkPalindrome(String str) {
  int start = 0;
  int end = str.length - 1;

  while (start < end) {
    if (str[start] != str[end]) {
      return false;
    }

    start++;
    end--;
  }

  return true;
}
```

Output:

```
flutter: Input: radar
flutter: Output:
flutter: radar is a palindrome.
```

9. Write a program to display the cube of the number up to an integer.

Test Data :

Input number of terms : 5

Expected Output :

Number is : 1 and cube of the 1 is :1

Number is : 2 and cube of the 2 is :8

Number is : 3 and cube of the 3 is :27

Number is : 4 and cube of the 4 is :64

Number is : 5 and cube of the 5 is :125

Source Code:

```
void main() {
  int numberOfTerms = 5;
```

```
  print("Input number of terms: $numberOfTerms");
  print("Expected Output:");

  for (int i = 1; i <= numberOfTerms; i++) {
    int cube = i * i * i;
    print("Number is: $i and cube of $i is: $cube");
  }
}
```

Output:

```
flutter: Input number of terms: 5
flutter: Expected Output:
flutter: Number is: 1 and cube of 1 is: 1
flutter: Number is: 2 and cube of 2 is: 8
flutter: Number is: 3 and cube of 3 is: 27
flutter: Number is: 4 and cube of 4 is: 64
flutter: Number is: 5 and cube of 5 is: 125
```

10. Write a program to display a pattern like a right angle triangle using an asterisk using loop.

The pattern like :

*

**

***

****

Source Code:

```
void main() {
  int rows = 4;

  print("Input number of rows: $rows");
  print("Pattern:");

  for (int i = 1; i <= rows; i++) {
    for (int j = 1; j <= i; j++) {
      print("*");
    }
    print("");
  }
}
```

Output:

```
Input number of rows: 4
Pattern:
*

*
*

*
*
*

*
*
*
*
```

11. Write a program to display a pattern like a right angle triangle with a number using loop.

The pattern like :

1

12

123

1234

Source Code:

```
void main() {
  int rows = 4;

  print("Input number of rows: $rows");
  print("Pattern:");

  for (int i = 1; i <= rows; i++) {
    for (int j = 1; j <= i; j++) {
      print("$j");
    }
    print("");
  }
}
```

Output:

```
Input number of rows: 4
Pattern:
1

1
2

1
2
3

1
2
3
4
```

12. Write a program to make such a pattern like a right angle triangle with a number which will repeat a number in a row.

The pattern like :

1

22

333

4444

Source Code:

```dart
import 'dart:io';

void main() {
  int rows = 4;

  print("Input number of rows: $rows");
  print("Pattern:");

  for (int i = 1; i <= rows; i++) {
    for (int j = 1; j <= i; j++) {
      stdout.write("$i");
    }
    stdout.writeln();
  }
}
```

Output:

```
flutter: Input number of rows: 4
flutter: Pattern:
1
22
333
4444
```

13. Write a program to make such a pattern like a right angle triangle with the number increased by 1 using loop..

The pattern like :

1

2 3

4 5 6

7 8 9 10

Source Code:

```dart
import 'dart:io';

void main() {
  int rows = 4;
  int currentNumber = 1;

  print("Input number of rows: $rows");
  print("Pattern:");

  for (int i = 1; i <= rows; i++) {
    for (int j = 1; j <= i; j++) {
      stdout.write("$currentNumber ");
      currentNumber++;
    }
    stdout.writeln();
  }
}
```

Output:

```
flutter: Input number of rows: 4
flutter: Pattern:
1
2 3
4 5 6
7 8 9 10
```

14. Write a program to make a pyramid pattern with numbers increased by 1. 1 2 3 4 5 6 7 8 9 10

Source Code:

```
import 'dart:io';

void main() {
  int rows = 4;
  int currentNumber = 1;

  print("Input number of rows: $rows");
  print("Pattern:");

  for (int i = 1; i <= rows; i++) {
    for (int j = 1; j <= i; j++) {
      stdout.write("$currentNumber ");
      currentNumber++;
    }
    stdout.writeln();
  }
}
```

Output:

```
flutter: Input number of rows: 4
flutter: Pattern:
1
2 3
4 5 6
7 8 9 10
```

15. Write a program to make such a pattern as a pyramid with an asterisk.

*

* *

* * *

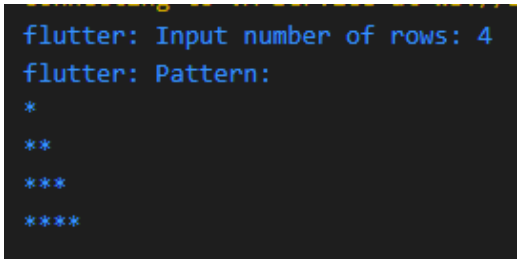
* * * *

Source Code:

```
import 'dart:io';

void main() {
  int rows = 4;
  //int currentNumber = 1;

  print("Input number of rows: $rows");
```

```
  print("Pattern:");

  for (int i = 1; i <= rows; i++) {
    for (int j = 1; j <= i; j++) {
      stdout.write("*");
      //currentNumber++;
    }
    stdout.writeln();
  }
}
```

Output:



16. Write a program that asks the user for their email and password. If the email and password match a predefined set of credentials, print "User login successful." Otherwise, keep asking for the email and password until the correct credentials are provided.

Source Code:

```
import 'dart:io';

void main() {
  final String correctEmail = "user@example.com";
  final String correctPassword = "password";

  bool isLoggedIn = false;

  while (!isLoggedIn) {
    String enteredEmail = input("Enter your email:");
    String enteredPassword = input("Enter your password:");

    if (enteredEmail == correctEmail && enteredPassword == correctPassword) {
      isLoggedIn = true;
      print("User login successful.");
    } else {
      print("Incorrect credentials. Please try again.");
    }
  }
}
```

```
String input(String prompt) {
  print(prompt);
  return stdin.readLineSync() ?? '';
}
```

Output:

```
Enter your email:
user@example.com
Enter your password:
password
User login successful.
PS C:\Users\Administrator\Desktop\Flutter Project\my_first_app\lib>
```

17. Write a program that asks the user for their email and password. You are given a list of predefined user credentials (email and password combinations). If the entered email and password match any of the credentials in the list, print "User login successful." Otherwise, keep asking for the email and password until the correct credentials are provided.

Source Code:

```
import 'dart:io';

void main() {
  List<Map<String, String>> credentials = [
    {"email": "user1@example.com", "password": "password1"},
    {"email": "user2@example.com", "password": "password2"},
    {"email": "user3@example.com", "password": "password3"},
  ];

  bool isLoggedIn = false;

  while (!isLoggedIn) {
    String enteredEmail = input("Enter your email:");
    String enteredPassword = input("Enter your password:");

    for (var credential in credentials) {
      if (credential["email"] == enteredEmail &&
          credential["password"] == enteredPassword) {
        isLoggedIn = true;
        print("User login successful.");
        break;
```

```
    }
   }

   if (!isLoggedIn) {
    print("Incorrect credentials. Please try again.");
   }
  }
}

String input(String prompt) {
  print(prompt);
  return stdin.readLineSync() ?? '';
}
```

Output:

```
Enter your email:
user1@example.com
Enter your password:
password1
User login successful.
```

18. Write a program that takes a list of numbers as input and prints the numbers greater than 5 using a for loop and if-else condition.

Source Code:

```
void main() {
  List<int> numbers = [2, 7, 4, 9, 1, 6, 8, 3, 5];

  print("Input numbers: $numbers");
  print("Numbers greater than 5:");

  for (int number in numbers) {
   if (number > 5) {
    print(number);
   } else {
    // Do nothing
   }
  }
}
```

Output:

```
flutter: Input numbers: [2, 7, 4, 9, 1, 6, 8, 3, 5]
flutter: Numbers greater than 5:
flutter: 7
flutter: 9
flutter: 6
flutter: 8
```

19. Write a program that counts the number of vowels in a given string using a for loop and if-else condition.

Source Code:

```
void main() {
  String inputString = "Hello, World!";
  int vowelCount = 0;

  print("Input string: $inputString");

  for (int i = 0; i < inputString.length; i++) {
    String currentChar = inputString[i].toLowerCase();

    if (currentChar == 'a' ||
        currentChar == 'e' ||
        currentChar == 'i' ||
        currentChar == 'o' ||
        currentChar == 'u') {
      vowelCount++;
    }
  }

  print("Number of vowels: $vowelCount");
}
```

Output:

```
flutter: Input string: Hello, World!
flutter: Number of vowels: 3
```

20. Implement a code that finds the maximum and minimum elements in a list using a for loop and if-else condition.

Source Code:

```
void main() {
  List<int> numbers = [3, 9, 1, 6, 4, 2, 8, 5, 7];
  int minElement = numbers[0];
  int maxElement = numbers[0];
```

```
  print("Input numbers: $numbers");

  for (int number in numbers) {
    if (number < minElement) {
      minElement = number;
    }

    if (number > maxElement) {
      maxElement = number;
    }
  }

  print("Minimum element: $minElement");
  print("Maximum element: $maxElement");
}
```

Output:

```
flutter: Input numbers: [3, 9, 1, 6, 4, 2, 8, 5, 7]
flutter: Minimum element: 1
flutter: Maximum element: 9
```

21. Write a program that calculates the sum of the squares of all odd numbers in a given list using a for loop and if-else condition.

Source Code:

```
void main() {
  List<int> numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10];
  int sumOfSquares = 0;

  print("Input numbers: $numbers");

  for (int number in numbers) {
    if (number % 2 != 0) {
      sumOfSquares += (number * number);
    }
  }

  print("Sum of squares of odd numbers: $sumOfSquares");
}
```

Output:

```
flutter: Input numbers: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
flutter: Sum of squares of odd numbers: 165
```

22. Write a program that takes a list of student details as input, where

each student is represented by a map containing their name, marks, section, and roll number. The program should determine the grade of each student based on their average score (assuming maximum marks for each subject is 100) and print the student's name along with their grade.

Source Code:

```
void main() {
  List<Map<String, dynamic>> students = [
    {
      'name': 'John',
      'marks': [80, 90, 95],
      'section': 'A',
      'rollNumber': 1,
    },
    {
      'name': 'Emma',
      'marks': [75, 85, 90],
      'section': 'B',
      'rollNumber': 2,
    },
    {
      'name': 'James',
      'marks': [70, 80, 85],
      'section': 'A',
      'rollNumber': 3,
    },
  ];

  print("Student Grades:");

  for (var student in students) {
    String name = student['name'];
    List<int> marks = student['marks'];
    int totalMarks = marks.reduce((a, b) => a + b);
    double averageMarks = totalMarks / marks.length;
    String grade;

    if (averageMarks >= 90) {
      grade = 'A';
    } else if (averageMarks >= 80) {
      grade = 'B';
    } else if (averageMarks >= 70) {
      grade = 'C';
    } else if (averageMarks >= 60) {
      grade = 'D';
```

```
    } else {
      grade = 'F';
    }

    print("$name - Grade: $grade");
  }
}
```

Output:

```
flutter: Student Grades:
flutter: John - Grade: B
flutter: Emma - Grade: B
flutter: James - Grade: C
```

24. Implement a code that finds the average of all the negative numbers in a list using a for loop and if-else condition.

Source Code:

```
void main() {
  List<int> numbers = [-2, 5, -10, 7, -3, 8, -6];
  int negativeCount = 0;
  int sumOfNegatives = 0;
  double averageOfNegatives = 0.0;

  print("Input numbers: $numbers");

  for (int number in numbers) {
    if (number < 0) {
      negativeCount++;
      sumOfNegatives += number;
    }
  }

  if (negativeCount > 0) {
    averageOfNegatives = sumOfNegatives / negativeCount;
  }

  print("Average of negative numbers: $averageOfNegatives");
}
```

Output:

```
flutter: Input numbers: [-2, 5, -10, 7, -3, 8, -6]
flutter: Average of negative numbers: -5.25
```

24. Write a program that takes a list of integers as input and returns a new list containing only the prime numbers from the original list. Implement the solution using a for loop and logical operations. Input: [4, 7, 10, 13, 16, 19, 22, 25, 28, 31] Output: [7, 13, 19, 31]

Source Code:

```
void main() {
  List<int> numbers = [4, 7, 10, 13, 16, 19, 22, 25, 28, 31];
  List<int> primeNumbers = [];

  print("Input numbers: $numbers");

  for (int number in numbers) {
    if (isPrime(number)) {
      primeNumbers.add(number);
    }
  }

  print("Prime numbers: $primeNumbers");
}

bool isPrime(int number) {
  if (number < 2) {
    return false;
  }

  for (int i = 2; i <= number / 2; i++) {
    if (number % i == 0) {
      return false;
    }
  }

  return true;
}
```

Output:

```
flutter: Input numbers: [4, 7, 10, 13, 16, 19, 22, 25, 28, 31]
flutter: Prime numbers: [7, 13, 19, 31]
```