Assignment 3: Branching and Looping

Akash Duttachowdhury

21052386

1. Guess a number game

The computer picks a random number from 1 to 5, the player tries to guess. The player may have the flexibility to enter the number in an expression format.

In [ ]:
```
# Akash Duttachowdhury | 21052386
import random
random_number = random.randint(1,5)
guess = int(input("Enter your guess: "))

if guess == random_number:
  print("Correct!")
else:
  print("Wrong! The number is", random_number)
```

```
Wrong! The number is 2
```

2. Kids Multiplication Table

Write a multiplication game program for kids. The program should give the player ten randomly generated multiplication questions to do. After each, the program should tell them whether they got it right or wrong and what the correct answer is.

In [ ]:
```
# Akash Duttachowdhury | 21052386
import random
for i in range(10):
    a = random.randint(1,10)
    b = random.randint(1,10)
    ans = int(input(f"Question {i+1}: {a} x {b} = "))
    if ans == a*b:
        print("Right!")
    else:
        print("Wrong. The answer is", a*b)
```

```
Right!
Wrong. The answer is 40
Right!
Right!
Right!
Right!
Right!
Right!
Right!
Wrong. The answer is 6
```

3. Check a list contains even number or not.

In [ ]:
```python
# Akash Duttachowdhury | 21052386
numbers = [11,33,55,39,55,75,37,21,23,41,13]
flag = 0
for number in numbers:
  if number%2==0:
    flag = 1
    break
if flag == 1:
  print("The list contains even no.s")
else:
  print("The list doesn't contain even no.s")
```

```
The list doesn't contain even no.s
```

4. Read N and generate the Fibonacci sequence upto N.

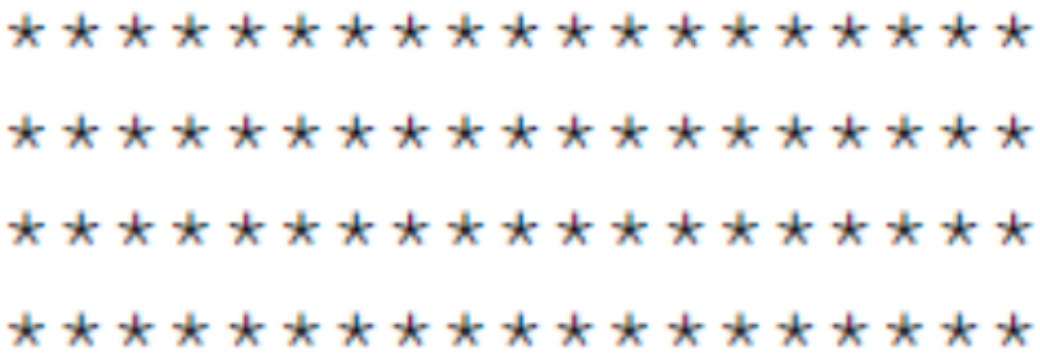
In [ ]:
```python
# Akash Duttachowdhury | 21052386
def fibonacci(n):
  fib_sequence = [0, 1]
  while len(fib_sequence) < n:
      fib_sequence.append(fib_sequence[-1] + fib_sequence[-2])
  return fib_sequence


n = int(input("Enter n: "))
print(f"Fibonacci Sequence upto {n} no.s")
fibonacci(n)
```

```
Fibonacci Sequence upto 10 no.s
```

Out[ ]:
```
[0, 1, 1, 2, 3, 5, 8, 13, 21, 34]
```

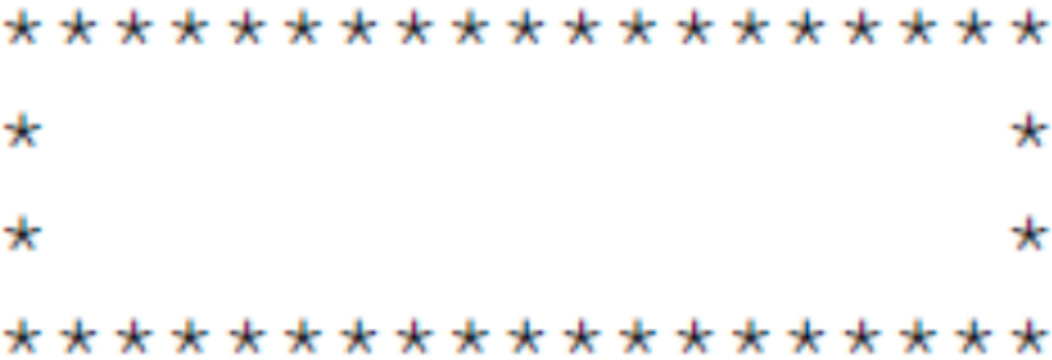
5. Use a for loop to print a box like the one below. Allow the user to specify how wide and how high the box should be. [Hint: print('*'*10) prints ten asterisks.]



In [ ]:
```
# Akash Duttachowdhury | 21052386
height = int(input("How high? "))
width = int(input("How wide? "))
for i in range(height):
    print("*"*width)
```

```
********
********
********
********
********
```

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



In [ ]:
```
# Akash Duttachowdhury | 21052386
num = int (input ("enter the num for rows and cols: "))
for i in range (num) :
    for j in range (num) :
        if i==0 or i==num-1 or j==0 or j==num-1:
            print ("*", end="")
        else:
            print (" ", end="")
    print ()
```

```
*****
*   *
*   *
*   *
*****
```

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

In [ ]:
```
# Akash Duttachowdhury | 21052386
rows = int(input("Enter the no. of rows: "))
k = 2*rows - 2
for i in range(0, rows):
    for j in range(0, k):
        print(end=" ")
    k -= 1
    for j in range(0, i+1):
        print("* ", end="")
    print("")
k = rows-2
for i in range(rows, -1, -1):
    for j in range(k, 0, -1):
        print(end=" ")
    k += 1
    for j in range(0, i+1):
        print("* ", end="")
    print("")
```

```
      *
     * *
    * * *
   * * * *
  * * * * *
 * * * * * *
  * * * * *
   * * * *
    * * *
     * *
      *
```

8. Write a program that lets the user play Rock-Paper-Scissors against the computer. There should be five rounds, and after those five rounds, your program should print out who won and lost or that there is a tie.

In [ ]:
```
# Akash Duttachowdhury | 21052386
import random

def get_user_choice():
    print("Choose: Rock, Paper, or Scissors")
    user_choice = input().lower()
    while user_choice not in ['rock', 'paper', 'scissors']:
        print("Invalid choice. Please choose: Rock, Paper, or Scissors")
```

```
        user_choice = input.lower()
    return user_choice

def get_computer_choice():
    return random.choice(['rock', 'paper', 'scissors'])

def determine_winner(user_choice, computer_choice):
    if user_choice == computer_choice:
        return "It's a tie!"
    elif (
        (user_choice == 'rock' and computer_choice == 'scissors') or
        (user_choice == 'paper' and computer_choice == 'rock') or
        (user_choice == 'scissors' and computer_choice == 'paper')
    ):
        return "You win!"
    else:
        return "Computer wins!"

def main():
    user_wins = 0
    computer_wins = 0
    for round_num in range(1,6):
        print(f"\nRound {round_num}")
        user_choice = get_user_choice()
        computer_choice = get_computer_choice()

        print(f"You chose: {user_choice}")
        print(f"Computer chose: {computer_choice}")

        result = determine_winner(user_choice, computer_choice)
        print(result)

        if result=="You win!":
            user_wins += 1
        elif result=="Computer wins!":
            computer_wins += 1

    print("\nGame Over!")
    print(f"You won {user_wins} rounds.")
    print(f"Computer won {computer_wins} rounds.")

    if user_wins > computer_wins:
        print("Congratulations! You are the overall winner.")
    elif user_wins < computer_wins:
        print("Sorry, the computer is the overall winner.")
    else:
        print("It's a tie!")

main()
```

```
Round 1
Choose: Rock, Paper, or Scissors
You chose: rock
Computer chose: rock
It's a tie!

Round 2
Choose: Rock, Paper, or Scissors
You chose: paper
Computer chose: rock
You win!

Round 3
Choose: Rock, Paper, or Scissors
You chose: scissors
Computer chose: scissors
It's a tie!

Round 4
Choose: Rock, Paper, or Scissors
You chose: rock
Computer chose: scissors
You win!

Round 5
Choose: Rock, Paper, or Scissors
You chose: paper
Computer chose: scissors
Computer wins!

Game Over!
You won 2 rounds.
Computer won 1 rounds.
Congratulations! You are the overall winner.
```

9. Playing with Magic Words

Here a word 'S' of length 'n' is said to be magic word if it satisfies the following conditions:

All letters of S are lowercase letters of the English alphabets.

Si, the character in the ith position, is lexicographically smaller than Sn-1-i for all even i from 0 to n/2

Si is lexicographically greater than Sn-1-i for all odd i from 0 to n/2

For example, the word "difference" is a magic word, while "similar" is not.

Given a word, write python code to check whether the word is magic or not.

In [ ]:
```python
# Akash Duttachowdhury | 21052386
def is_magic_word(word):
    n = len(word)
    if not all(char.islower() for char in word):
        return False
    for i in range(n//2):
```

```
        if i%2 == 0 and not word[i]<word[n-1-i]:
            return False
        elif i%2 != 0 and not word[i]>word[n-1-i]:
            return False
    return True

input_word = input("Enter a word: ")
if is_magic_word(input_word):
    print(f"The word '{input_word}' is a magic word.")
else:
    print(f"The word '{input_word}' is not a magic word.")
```

```
The word 'scissors is not a magic word.
```