PROJECT REPORT
ON
COW BULLS GAME
(PYTHON)

1 Introduction

Cows and Bulls is a pen and paper code-breaking game usually played between 2 players. In this, a player tries to guess a secret code number chosen by the second player. The rules are as follows:

- A player will create a secret code, usually a 4-digit number. This number should have no repeated digits.

- Another player makes a guess (4 digit number) to crack the secret number. Upon making a guess, 2 hints will be provided- Cows and Bulls.

- Bulls indicate the number of correct digits in the correct position and cows indicates the number of correct digits in the wrong position. For example, if the secret code is 1234 and the guessed number is 1246 then we have 2 BULLS (for the exact matches of digits 1 and 2) and 1 COW (for the match of digit 4 in the wrong position)

- The player keeps on guessing until the secret code is cracked. The player who guesses in the minimum number of tries wins.

Explanation:

- Let's see a sample run for better understanding.
- Secret Code: 3768

- Guess: 1234
- Response: 0 bulls, 1 cow
- Guess: 5678
- Response: 1 bull, 2 cows
- Guess: 1678
- Response: 1 bull, 2 cows
- Guess: 3678
- Response: 2 bulls, 2 cows
- Guess: 3148

- Response: 2 bulls, 0 cows
- Guess: 3768
- You guessed right!

Approach:

To create this game in Python, the computer generates a secret code and the user will have to guess the code. Break it down into these blocks:

- Generate a secret code- Generate a random 4-digit number and check that it does not have any repeated digits.

- Generate hint or response- Take the generated 4-digit secret number and the guessed number (input). Find the common digits with exact matches (bulls) and the common digits in the wrong position (cows). Repeat with each guess until you have 4 bulls (an exact match) or you run out of tries.

Constraint: The secret code and the guessed code should be of 4-digits (between 1000 and 9999) and have no repeated numbers.

CODE:

```python
import random
def getDigits(num):
    return [int(i) for i in str(num)]


def noDuplicates(num):
    num_li = getDigits(num)
    if len(num_li) == len(set(num_li)):
        return True
    else:
```

```python
        return False

def generateNum():
    while True:
        num = random.randint(1000,9999)
        if noDuplicates(num):
            return num

def numOfBullsCows(num,guess):
    bull_cow = [0,0]
    num_li = getDigits(num)
    guess_li = getDigits(guess)

    for i,j in zip(num_li,guess_li):
        if j in num_li:
            if j == i:
                bull_cow[0] += 1

            else:
                bull_cow[1] += 1

    return bull_cow

# Secret Code

print('--------------------------------')
```
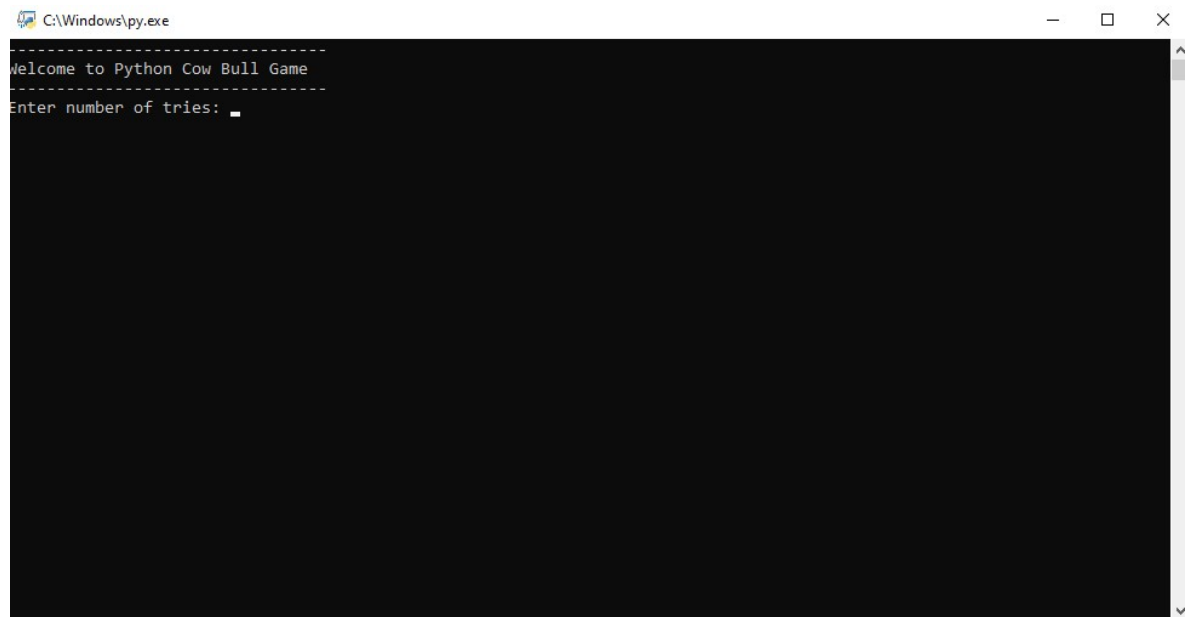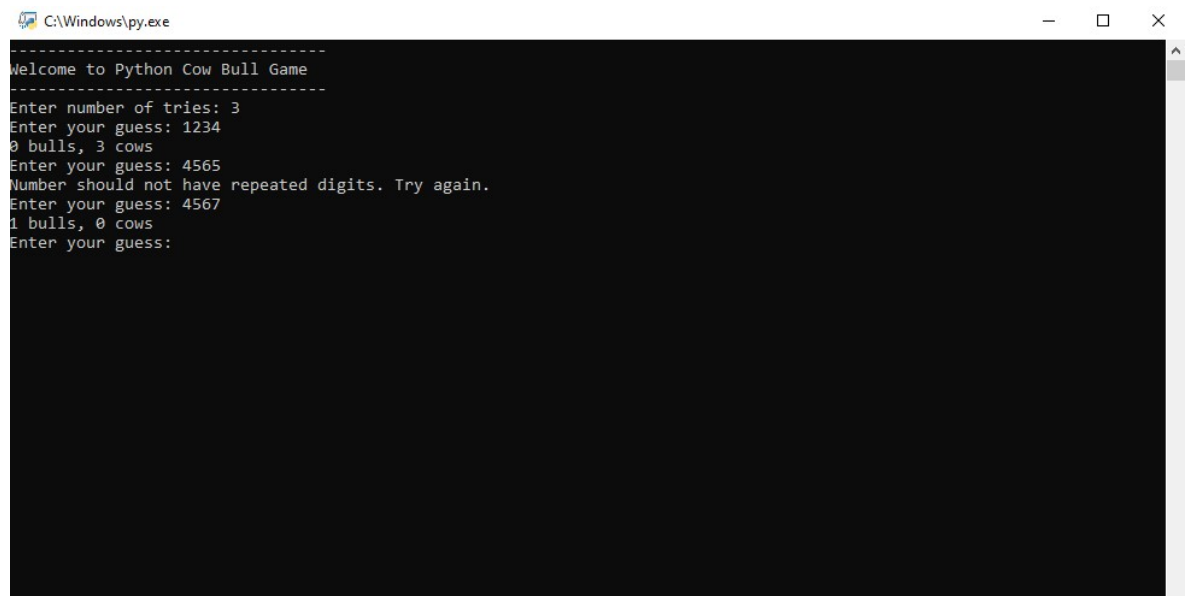
```python
print( 'Welcome to Python Cow Bull Game ')
print('--------------------------------')

num = generateNum()
tries =int(input('Enter number of tries: '))
# Play game until correct guess
# or till no tries left
while tries > 0:
    guess = int(input("Enter your guess: "))

    if not noDuplicates(guess):
        print("Number should not have repeated digits. Try again.")
        continue
    if guess < 1000 or guess > 9999:
        print("Enter 4 digit number only. Try again.")
        continue

    bull_cow = numOfBullsCows(num,guess)
    print(f"{bull_cow[0]} bulls, {bull_cow[1]} cows")
    tries -=1

    if bull_cow[0] == 4:
        print("You guessed right!")
        break
else:
    print(f"You ran out of tries. Number was {num}")
```

OUTPUT:

```
C:\Windows\py.exe                                                    —    □    ✕
---------------------------------
Welcome to Python Cow Bull Game
---------------------------------
Enter number of tries: _
```

```
C:\Windows\py.exe                                                    —    □    ✕
---------------------------------
Welcome to Python Cow Bull Game
---------------------------------
Enter number of tries: 3
Enter your guess: 1234
0 bulls, 3 cows
Enter your guess: 4565
Number should not have repeated digits. Try again.
Enter your guess: 4567
1 bulls, 0 cows
Enter your guess:
```