Bahria University,

Karachi Campus

COURSE

ARTIFICIAL INTELLIGENCE

Term: Spring 2024

Class: BSE- 6(B)

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Signed _____ **Remarks:** _____

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Bahria University,

Karachi Campus

LAB NO. 01

LIST OF TASKS

TASK NO	OBJECTIVE
01	**Calculator Program**: Create a simple calculator program that can perform basic arithmetic operations like addition, subtraction, multiplication, and division
02	**Guess the Number Game**: Write a program that generates a random number and asks the user to guess it. Provide hints such as "too high" or "too low" until the user guesses the correct number.
03	**Palindrome Checker**: Write a program that checks if a given string is a palindrome (reads the same forwards and backwards).
04	**Word Counter**: Create a program that counts the frequency of words in a given text file or input string.
05	**Fizz Buzz:** Write a program that prints the numbers from 1 to 100. But for multiples of three, print "Fizz" instead of the number, and for the multiples of five, print "Buzz". For numbers that are multiples of both three and five, print "Fizz Buzz".
06	**Temperature Converter:** Create a program that converts temperatures between Celsius and Fahrenheit.
07	**Temperature Converter:** Create a program that converts temperatures between Celsius and Fahrenheit.
08	**File Manipulation:** Write a program that reads data from a text file, performs some operation (e.g., sorting, filtering), and writes the result to another file.

Submitted On:

17th February , 2024

(Date: DD/MM/YY)

AIMAN ZIA SATTI **BSE-6B** **02-131212-028**

TASK 1: Create a simple calculator program that can perform basic arithmetic operations like addition, subtraction, multiplication, and division.

SOLUTION:

```
def add(x, y):
    return x + y
def subtract(x, y):
    return x - y
def multiply(x, y):
    return x * y
def divide(x, y):
    if y == 0:
        return "Error! Division by zero."
    else:
        return x / y
print("Select operation:")
print("1. Addition")
print("2. Subtraction")
print("3. Multiplication")
print("4. Division")
while True:
    choice = input("Enter choice (1/2/3/4): ")
    if choice in ('1', '2', '3', '4'):
        num1 = float(input("Enter first number: "))
        num2 = float(input("Enter second number: "))
        if choice == '1':
            print("Result:", add(num1, num2))
        elif choice == '2':
            print("Result:", subtract(num1, num2))
        elif choice == '3':
            print("Result:", multiply(num1, num2))
        elif choice == '4':
            print("Result:", divide(num1, num2))
    else:
        print("Invalid input")
    next_calculation = input("Do you want to perform another
calculation? (yes/no): ")
    if next_calculation.lower() != "yes":
        break
```

OUTPUT:

```
Select operation:
1. Addition
2. Subtraction
3. Multiplication
4. Division
Enter choice (1/2/3/4): 1
Enter first number: 12
Enter second number: 23
Result: 35.0
Do you want to perform another calculation? (yes/no):
```

```
Do you want to perform another calculation? (yes/no): yes
Enter choice (1/2/3/4): 90
Invalid input
Do you want to perform another calculation? (yes/no): yes
Enter choice (1/2/3/4): 4
Enter first number: 90
Enter second number: 2
Result: 45.0
```

```
Do you want to perform another calculation? (yes/no): yes
Enter choice (1/2/3/4): 2
Enter first number: 77
Enter second number: 41
Result: 36.0
Do you want to perform another calculation? (yes/no):
```

TASK 2: Write a program that generates a random number and asks the user to guess it. Provide hints such as "too high" or "too low" until the user guesses the correct number.

SOLUTION:

```
import random
def guess_number():
    secret_number = random.randint(1, 100)
    while True:
        try:
            guess = int(input("Guess the number between 1 and 100: "))
            if guess == secret_number:
                print("Congratulations! You guessed the correct
number:", secret_number)
                break
            elif guess < secret_number:
                print("Too low! Try again.")
            else:
                print("Too high! Try again.")
        except ValueError:
            print("Invalid input! Please enter a valid number.")
```

```
if __name__ == "__main__":
    guess_number()
```

OUTPUT:

```
Guess the number between 1 and 100:  30
Too low! Try again.
Guess the number between 1 and 100:  99
Too high! Try again.
Guess the number between 1 and 100:  20
Too low! Try again.
Guess the number between 1 and 100:  11
Too low! Try again.
Guess the number between 1 and 100:  50
Too high! Try again.
Guess the number between 1 and 100:  78
Too high! Try again.
Guess the number between 1 and 100:
```

TASK 3: Write a program that checks if a given string is a palindrome (reads the same forwards and backwards).

SOLUTION:

```
def is_palindrome(s):
    s = s.replace(" ", "").lower()
    return s == s[::-1]
if __name__ == "__main__":
    string = input("Enter a string: ")
    if is_palindrome(string):
        print("Yes, the string is a palindrome.")
    else:
        print("No, the string is not a palindrome.")
```

OUTPUT:

```
Enter a string:  DAD
Yes, the string is a palindrome.
```

```
Enter a string:  AIMAN
No, the string is not a palindrome.
```

TASK # 4: Create a program that counts the frequency of words in a given text file or input string.

SOLUTION:

```
import re
from collections import Counter

def count_word_frequency(text):
    words = re.findall(r'\b\w+\b', text.lower())
    word_count = Counter(words)
    return word_count
```

```
def main():
    choice = input("Enter 'file' to count words from a file or 'text'
to count words from input text: ").lower()

    if choice == 'file':
        file_name = input("Enter the file name: ")
        try:
            with open(file_name, 'r') as file:
                text = file.read()
                word_count = count_word_frequency(text)
                print(word_count)
        except FileNotFoundError:
            print("File not found.")
    elif choice == 'text':
        text = input("Enter the text: ")
        word_count = count_word_frequency(text)
        print(word_count)
    else:
        print("Invalid choice. Please enter 'file' or 'text'.")

if __name__ == "__main__":
    main()
```

```
Enter 'file' to count words from a file or 'text' to count words from input text:  example.txt
```

"this": 2 times
"is": 1 time
"a": 1 time
"sample": 2 times
"text": 2 times
"file": 2 times
"contains": 1 time
"some": 1 time
"for": 1 time
"demonstration": 1 time
"purposes": 1 time

TASK#5: Write a program that prints the numbers from 1 to 100. But for multiples of three, print "Fizz" instead of the number, and for the multiples of five, print "Buzz". For numbers that are multiples of both three and five, print "Fizz Buzz".

SOLUTION:

```
def fizz_buzz():
    for i in range(1, 101):
        if i % 3 == 0 and i % 5 == 0:
            print("Fizz Buzz")
        elif i % 3 == 0:
            print("Fizz")
        elif i % 5 == 0:
            print("Buzz")
        else:
            print(i)

if __name__ == "__main__":
    fizz_buzz()
```

OUTPUT:

```
1
2
Fizz
4
Buzz
Fizz
7
8
Fizz
Buzz
11
Fizz
13
14
Fizz Buzz
16
17
Fizz
19
Buzz
Fizz
22
23
Fizz
Buzz
26
Fizz
28
29
Fizz Buzz
31
32
Fizz
```

TASK 6: Create a program that converts temperatures between Celsius and Fahrenheit

SOLUTION:

```
def celsius_to_fahrenheit(celsius):
    return (celsius * 9/5) + 32

def fahrenheit_to_celsius(fahrenheit):
    return (fahrenheit - 32) * 5/9

if __name__ == "__main__":
    print("Temperature Converter")
    print("1. Celsius to Fahrenheit")
    print("2. Fahrenheit to Celsius")

    choice = input("Enter your choice (1 or 2): ")

    if choice == "1":
        celsius = float(input("Enter temperature in Celsius: "))
        fahrenheit = celsius_to_fahrenheit(celsius)
        print(f"{celsius}°C is equal to {fahrenheit:.2f}°F")
    elif choice == "2":
        fahrenheit = float(input("Enter temperature in Fahrenheit: "))
        celsius = fahrenheit_to_celsius(fahrenheit)
        print(f"{fahrenheit}°F is equal to {celsius:.2f}°C")
    else:
        print("Invalid choice. Please enter 1 or 2.")
```

OUTPUT:

```
Temperature Converter
1. Celsius to Fahrenheit
2. Fahrenheit to Celsius
Enter your choice (1 or 2):  1
Enter temperature in Celsius:  78
78.0°C is equal to 172.40°F
```

```
Temperature Converter
1. Celsius to Fahrenheit
2. Fahrenheit to Celsius
Enter your choice (1 or 2):  2
Enter temperature in Fahrenheit:  65
65.0°F is equal to 18.33°C
```

TASK 7: Implement the classic game of Hangman where the user has to guess a word by suggesting letters within a certain number of attempts.

SOLUTION:

```
import random
def choose_word():
```

```
    words = ["apple", "banana", "orange", "grape", "strawberry",
"pineapple", "watermelon"]
    return random.choice(words)
def display_word(word, guessed_letters):
    display = ""
    for letter in word:
        if letter in guessed_letters:
            display += letter
        else:
            display += "_"
    return display
def hangman():
    word = choose_word()
    guessed_letters = []
    attempts = 6
    print("Welcome to Hangman!")
    print("The word contains", len(word), "letters.")
    while True:
        print("\nAttempts left:", attempts)
        print("Word:", display_word(word, guessed_letters))
        if "_" not in display_word(word, guessed_letters):
            print("Congratulations! You've guessed the word:", word)
            break
        guess = input("Guess a letter: ").lower()
        if guess in guessed_letters:
            print("You've already guessed that letter!")
            continue
        guessed_letters.append(guess)
        if guess not in word:
            print("Incorrect guess!")
            attempts -= 1
            if attempts == 0:
                print("You've run out of attempts! The word was:",
word)
                break
        else:
            print("Correct guess!")
hangman()
```

OUTPUT:

```
Welcome to Hangman!
The word contains 6 letters.

Attempts left: 6
Word: ______
Guess a letter:  hot
Incorrect guess!

Attempts left: 5
Word: ______
Guess a letter:  apple
Incorrect guess!

Attempts left: 4
Word: ______
Guess a letter:  grape
Incorrect guess!

Attempts left: 3
Word: ______
Guess a letter:
```

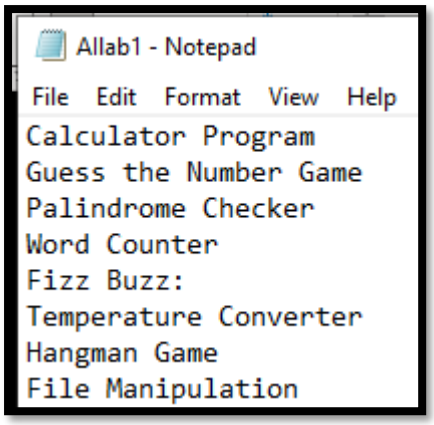
TASK 8: Write a program that reads data from a text file, performs some operation (e.g., sorting, filtering), and writes the result to another file.

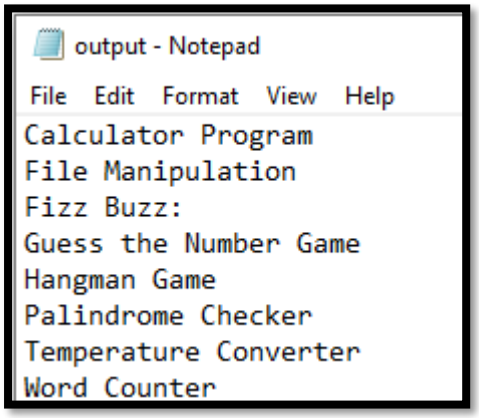
SOLUTION:

```
def sort_lines(input_file, output_file):
    try:
        with open(input_file, 'r') as file:
            lines = file.readlines()
            sorted_lines = sorted(lines)
            with open(output_file, 'w') as output:
                for line in sorted_lines:
                    output.write(line)
        print("Sorting completed. Result written to", output_file)
    except FileNotFoundError:
        print("File not found.")

def main():
    input_file = input("Enter the input file name: ")
    output_file = input("Enter the output file name: ")
    sort_lines(input_file, output_file)

if __name__ == "__main__":
    main()
```

OUTPUT:

```
Enter the input file name:  AIlab1
Enter the output file name:  output
```


Allab1 - Notepad
File Edit Format View Help
Calculator Program
Guess the Number Game
Palindrome Checker
Word Counter
Fizz Buzz:
Temperature Converter
Hangman Game
File Manipulation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