Assignment 1

SEMISTER 3rd

fall-2024

SUBJECT

Database Structures

COURSE CODE

CC210

PROGRAMME

BS (4 year)

ABBOTTABAD UNIVERSITY OF SCIENCE AND TECHNOLGY ISLAMABAD

SUBMITTED TO

Mr. Jamal Abdul Ahad

SUBMITTED BY

Haroon Imran

STUDENT ROLL NO

14723

SUBMISSION DATE

8 October 2024

Exercise:1

```
print("Hello, Python!")
```

Exercise:2

1. Declare variables of different data types:
   age = 25 name = "Alice"
   height = 5.9
   is student = True
2. Write a program to convert Celsius to Fahrenheit:
   celsius = 25
   fahrenheit = (celsius * 9/5) + 32
   print(f"{celsius}°C is {fahrenheit}°F")

```
25°C is 77.0°F
```

3. Concatenate strings:
   first name = "John
   last_name = "Doe"
   full_name = first_name + " " + last_name print(full_name)

Exercise:3

1. Write a program that takes a user's name and age as input and prints a greeting:
   name = input("Enter your name: ")
   age = input("Enter your age: ")
   print(f"Hello {name}, you are {age} years old.")

```
Enter your name: haroon
Enter your age: 20
Hello haroon, you are 20 years old.
```

2. Create a program to calculate the area of a rectangle:
   length = float(input("Enter the length: "))
   width = float(input("Enter the width: "))
   area = length * width
   print(f"The area of the rectangle is {area} square units.")

```
Enter the length: 3.3
Enter the width: 4.4
The area of the rectangle is 14.52 square units.
```

Exercise:4

1. Write a program that performs all basic arithmetic operations between two numbers.

```
num_1=23
num_2=2
operators=input("Choose basic operator  `+`, `-`, `*`, `/`, `//`, `%`, `**`  ")
if operators=="+":
    print(num_1+num_2)
elif operators=="-":
    print(num_1-num_2)
elif operators=="*":
    print(num_1*num_2)
elif operators=="/":
    print(num_1/num_2)
else:
    print("choose correct operator")
```

Output

```
Choose basic operator  `+`, `-`, `*`, `/`, `//`, `%`, `**`  +
25
PS F:\3rd Semister\DSA> & "C:/Program Files/Python312/python.exe" "f:
Choose basic operator  `+`, `-`, `*`, `/`, `//`, `%`, `**`  /
11.5
PS F:\3rd Semister\DSA> & "C:/Program Files/Python312/python.exe" "f:
Choose basic operator  `+`, `-`, `*`, `/`, `//`, `%`, `**`  -
21
```

2.Write a program that checks if a number is even or odd

```
a = eval(input("Enter Any Number"))
if a % 2 == 0 :
    print("The Numnber is Even")
else:
    print("The Number is Odd")
```

Output:

```
Enter Any Number3
The Number is Odd
```

3.Implement a simple calculator with addition, subtraction, multiplication, and division

```
num_1=input("Enter a first no ")
num_2=input("Enter a 2nd no ")
operators=input("Choose basic operator  `+`, `-`, `*`, `/`, `//`, `%`, `**`  ")
if operators=="+":
    print(num_1+num_2)
elif operators=="-":
    print(num_1-num_2)
elif operators=="*":
    print(num_1*num_2)
elif operators=="/":
    print(num_1/num_2)
else:
    print("choose correct operator")
```

Output:

```
Enter Any Number3
The Number is Odd
PS F:\3rd Semister\DSA> & "C:/Program Files/Python312/python.ex
Enter a first no 3
Enter a 2nd no 4
Choose basic operator  `+`, `-`, `*`, `/`, `//`, `%`, `**`  +
34
```

Exercise:5

1. Write a program that determines if a number is positive, negative, or zero.

```
a = int(input("Enter Any Integer"))

if a>=0:
    print("The Number is Positive")
else:
    print("The Number is Negative")

```

Output:

```
Enter Any Integer5
The Number is Positive
```

2. Create a program that checks if a year is a leap year.

```
year =int(input("Enter a year"))
if year%4==0 and (year%100!=0 or year%400==0):
    print(year,"it is a leap year")
else:
    print(year,"it is not a leap year")
```

Output:

```
Enter a year4
4 it is a leap year
```

3. Write a program to determine the largest of three numbers.

```
a=int(input("Enter Any Integer"))
b=int(input("Enter Any Integer"))
c=int(input("Enter Any Integer"))
if a>b and b>c:
    print("a is greater")
elif b>a and a>c:
    print("b is greater")
elif c>a and c>b:
    print("c is greater")
```

Output:

```
Enter Any Integer3
Enter Any Integer4
Enter Any Integer6
c is greater
```

Exercise:6

1. Print the first 10 natural numbers using a `for` loop.

```
2. for i in range(1,11):
3.     print(i)
```

```
4.
```

Output:

```
1
2
3
4
5
6
7
8
9
10
```

2. Write a program to find the sum of numbers from 1 to `n` using a `while` loop.

```
i=1
sum=0
n=int(input("enter ending number"))
while(i<n):
    sum=i+sum
    print(sum)
    i+=1
```

Output:

```
enter ending number5
1
3
6
10
```

3. Print the multiplication table of a number given by the user.

```
n= int(input("Enter a number for table:"))
for i in range(1,11):
   print(n,"x",i,"=",i*10)
```

Output:

```
Enter a number for table:4
4 x 1 = 10
4 x 2 = 20
4 x 3 = 30
4 x 4 = 40
4 x 5 = 50
4 x 6 = 60
4 x 7 = 70
4 x 8 = 80
4 x 9 = 90
4 x 10 = 100
```

Exercise:7

1. Write a function to find the factorial of a number.

```
n=int(input("enter a num for fibonacci:"))
a=0
b=1
s=0
for x in range(n):
    print(s,end=" ")
    s=a+b
    b=a
    a=s
```

Output:

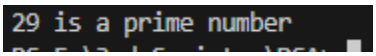
```
enter a num for fibonacci:4
0 1 1 2
```

2. Create a function that checks if a number is prime.

```
n = 29  # Example number to check


if n < 2:
```

```
    print(f"{n} is not a prime number")
else:
    is_prime = True
    for i in range(2, int(n ** 0.5) + 1):
        if n % i == 0:
            is_prime = False
            break

    if is_prime:
        print(f"{n} is a prime number")
    else:
        print(f"{n} is not a prime number")
```

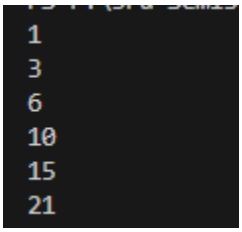
Output:



3. Write a function to calculate the sum of a list of numbers.

```
sum=0
numbers=[1,2,3,4,5,6]
for i in numbers:
    sum=sum+i
    print(sum)
```

Output:



Exercise:8

1. Write a program to find the largest number in a list.

```
numbers = [10, 24, 36, 45, 12, 99, 54]  # Example list

largest = numbers[0]

for num in numbers:
    if num > largest:
        largest = num

print(f"The largest number in the list is: {largest}")
```

Output:

```
The largest number in the list is: 99
```

2. Convert a list to a set to remove duplicates.

```
numbers = [10, 24, 36, 45, 12, 99, 54, 24, 36, 99]

unique_numbers = set(numbers)

print(unique_numbers)
```

Output:

```
{99, 36, 10, 12, 45, 54, 24}
```

3. Write a program to count the frequency of each character in a string using a dictionary.

```
text = "hello world"

char_count = {}

for char in text:

   char_count[char] = char_count.get(char, 0) + 1

print(char_count)
```

Output:

```
{'h': 1, 'e': 1, 'l': 3, 'o': 2, ' ': 1, 'w': 1, 'r': 1, 'd': 1}
```

Exercise:9

1. Write a program to read a text file and display its content.

```
filename = ' user_input.txt '
with open(filename, 'r') as file:
    content = file.read()
print(content)
```

Output:

```
haroon is a programer
```

2. Write a program that writes user input to a file.

```
filename = 'user_input.txt'

with open(filename, 'w') as file:

    user_input = input("Please enter some text: ")

        file.write(user_input)

print(f"Your input has been written to {filename}.")
```

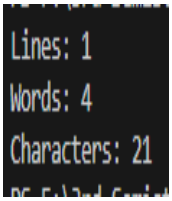
Output:

```
Please enter some text: haroon is a programer
Your input has been written to user_input.txt.
```

3. Create a program to count the number of lines, words, and characters in a file.

```
filename = 'user_input.txt'

with open(filename, 'r') as file:

    content = file.readlines()

line_count = len(content)

word_count = sum(len(line.split()) for line in content)

char_count = sum(len(line) for line in content)

print(f"Lines: {line_count}")

print(f"Words: {word_count}")

print(f"Characters: {char_count}")
```

Output:



Exercise:10

1. Define a class `Student` with attributes `name` and `age`, and a method `display` that prints the student's information.

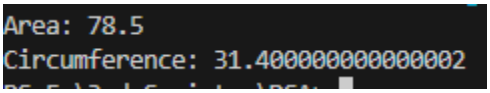
```
class Student:
    def __init__(self, name, age):
        self.name = name
        self.age = age
    def display(self):

        print(f"Name: {self.name}, Age: {self.age}")
student1 = Student("Alice", 20)
student1.display()
```

Output:

2. **Create a class `Circle` with methods to calculate area and circumference.**

```
class Circle:
    def __init__(self, radius):
        self.radius = radius

    def area(self):
        return 3.14 * self.radius ** 2

    def circumference(self):
        return 2 * 3.14 * self.radius
circle = Circle(5)
print("Area:", circle.area())
print("Circumference:", circle.circumference())
```

Output:



3. **Write a class `BankAccount` that supports deposit and withdrawal operations.**

```
class BankAccount:
    def __init__(self, account_number, balance=0):
        self.account_number = account_number
        self.balance = balance
    def deposit(self, amount):
        if amount > 0:
            self.balance += amount
            print(f"Deposited: ${amount:.2f}")
        else:
            print("Deposit amount must be positive.")

    def withdraw(self, amount):
        if 0 < amount <= self.balance:
            self.balance -= amount
            print(f"Withdrew: ${amount:.2f}")
        else:
            print("Insufficient funds or invalid amount.")

    def get_balance(self):
        return self.balance
account = BankAccount("12345678")
account.deposit(100)
print("Current Balance:", account.get_balance())
account.withdraw(50)
print("Current Balance:", account.get_balance())
account.withdraw(100)
```

Output:

```
Deposited: $100.00
Current Balance: 100
Withdrew: $50.00
Current Balance: 50
Insufficient funds or invalid amount.
PS E:\3rd Semister\DSA>
```

Exercise:11

1. Write a program that uses functions, loops, and conditionals to simulate a simple calculator with a user menu.

```
2. def calculator():
3.     while True:
```

```
        print("\nSimple Calculator")
        print("1. Add")
        print("2. Subtract")
        print("3. Multiply")
        print("4. Divide")
        print("5. Exit")

        choice = input("Select an operation (1-5): ")

        if choice == '5':
            print("Exiting the calculator. Goodbye!")
            break

        if choice in ['1', '2', '3', '4']:
            num1 = float(input("Enter the first number: "))
            num2 = float(input("Enter the second number: "))

            if choice == '1':
                print(num1, num2)
            elif choice == '2':
                print(num1, num2)
            elif choice == '3':
                print(num1, num2)
            elif choice == '4':
                print(num1, num2)
        else:
            print("Invalid input! Please select a valid option.")
calculator()
```

Output:

```
Simple Calculator
1. Add
2. Subtract
3. Multiply
4. Divide
5. Exit
Select an operation (1-5): 3
Enter the first number: 4
Enter the second number: 5
4.0 5.0

Simple Calculator
1. Add
2. Subtract
3. Multiply
4. Divide
5. Exit
Select an operation (1-5): 5
Exiting the calculator. Goodbye!
```

2. Write a program that reads data from a file, processes it, and writes the output to another file.

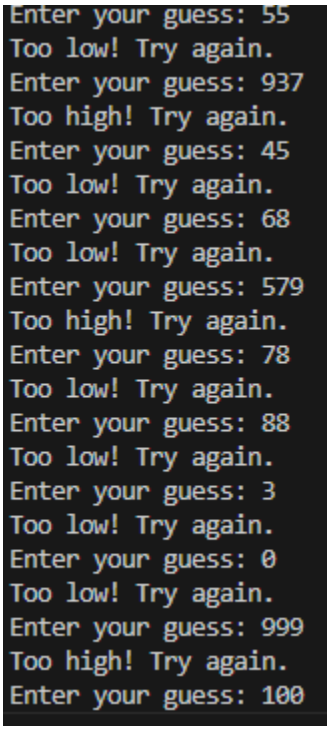
```
with open('user_input.txt', 'r') as infile, open('user_input.txt', 'w') as outfile:
    data = infile.read()
    outfile.write(data.upper())


print("Data processed and written to output.txt.")
```

Output:

3. Create a project to build a basic text-based game (e.g., number guessing game).

```
import random
def guess_number_game():
    number = random.randint(1, 100)
    attempts = 0
    print("Welcome to the Number Guessing Game!")
    print("Guess a number between 1 and 100.")
    while True:
        guess = int(input("Enter your guess: "))
        attempts += 1
        if guess < number:
            print("Too low! Try again.")
        elif guess > number:
            print("Too high! Try again.")
        else:
            print(f"Congratulations! You guessed the number in {attempts} attempts.")
            break
guess_number_game()
```

Output:


Enter your guess: 55
Too low! Try again.
Enter your guess: 937
Too high! Try again.
Enter your guess: 45
Too low! Try again.
Enter your guess: 68
Too low! Try again.
Enter your guess: 579
Too high! Try again.
Enter your guess: 78
Too low! Try again.
Enter your guess: 88
Too low! Try again.
Enter your guess: 3
Too low! Try again.
Enter your guess: 0
Too low! Try again.
Enter your guess: 999
Too high! Try again.
Enter your guess: 100