MIDTERM – TEST SKILL	
Course Code: CPE 201L	**Program:** BS Computer Engineering
Course Title: Data Structures and Algorithms	**Date Performed:** 9/06/2025
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1.Objectives

Implement an Array of even integers less than 50 but not less than 20 and do the following operations:

a. Display the elements
b. Find the maximum element
c. Reverse the array

2. Discussion

In this task, I utilized lists in Python to collect even numbers within a specified range. I employed loops and conditions to generate the list and iterate through each element for actions such as displaying and identifying the largest number. To determine the maximum, I examined each number individually, utilizing a straightforward search technique. I reversed the list by exchanging elements from both ends until the entire list was turned around. Finally, I created a menu that allows users to select which action to carry out, employing loops and decision-making to manage the program's flow. These concepts are crucial for managing data and creating interactive programs

3. Materials and Equipment

1. Github
2. Colab
3. MS Word

4. Procedure

a. **Create the Array**
I started by creating an empty list called Arr. Then, I used a for loop to go through numbers from 20 up to 49. Inside the loop, I checked if each number was even by using the modulo operator (%). If the number was even, I added it to the list.

b. **Display the Elements**
I wrote a function to print each element in the list one by one, using a loop to go through all the elements.

c. **Find the Maximum Element**
To find the largest number, I created a function that checked each element in the list. I compared each number to the current maximum and updated it if I found a bigger number.

d. **Reverse the Array**
I wrote a function that reversed the list by swapping elements from the start and the end, moving towards the middle until the whole list was reversed.

e. **User Interaction**
Finally, I set up a menu inside a loop that lets the user choose to print the array, find the maximum, reverse the list, or exit the program. Based on the user's choice, the corresponding function is called, and the program continues until the user decides to exit.

5. Output

CODE:

```python
Arr = []

for i in range(20, 50):
    if i % 2 == 0:
        Arr.append(i)

def print_array():
    print("\nArray Elements:")
    for i in range(len(Arr)):
        print(f"{Arr[i]}")

def find_max():
    max_element = Arr[0]
    for i in range(1, len(Arr)):
        if Arr[i] > max_element:
            max_element = Arr[i]
    print("\nMaximum element in the array:", max_element)

def reversed_array():
    reversed_arr = Arr[::-1]
    print("\nReversed array:")
    for element in reversed_arr:
        print(element)
```

FIGURE 1. 1ST PART OF CODE

```python
while True:
    print("\nChoose an option:")
    print("1. Display Element")
    print("2. Find Maximum Element")
    print("3. Reverse Array")
    print("4. Exit")

    choice = input("Enter your choice: ")

    if choice == "1":
        print_array()
    elif choice == "2":
        find_max()
    elif choice == "3":
        reversed_array()
    elif choice == "4":
        print("\nProgram terminated.")
        break
    else:
        print("\nInvalid. Please choose again!")
```

FIGURE 2. 2ND PART OF CODE

OUTPUT:

```
Choose an option:
1. Display Element
2. Find Maximum Element
3. Reverse Array
4. Exit
Enter your choice: 1

Array Elements:
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
```

FIGURE 3. DISPLAY ELEMENT

```
Choose an option:
1. Display Element
2. Find Maximum Element
3. Reverse Array
4. Exit
Enter your choice: 2

Maximum element in the array: 48
```

FIGURE 4. MAXIMUM ELEMENT

```
Choose an option:
1. Display Element
2. Find Maximum Element
3. Reverse Array
4. Exit
Enter your choice: 3

Reversed array:
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
```

FIGURE 5. REVERSED ARRAY

6. Conclusion

In this task, I generated and modified a list of even numbers using Python. I created functions to display elements, find the highest value, and reverse the array. This helped me practice important programming concepts like loops, conditionals, and list handling. Additionally, using a menu-driven approach helped me understand how to build interactive and user-friendly programs. Overall, this activity improved my skills in managing arrays and controlling program flow in Python.

7. References

1. Python Software Foundation. *Built-in functions*. Python.org. https://docs.python.org/3/library/functions.html
2. Python Software Foundation. More on lists [Documentation].

https://docs.python.org/3/tutorial/datastructures.html#more-on-lists
3. W3Schools. *Python lists*. https://www.w3schools.com/python/python_lists.asp
4. GeeksforGeeks. Find maximum and minimum element in an array. https://www.geeksforgeeks.org/maximum-and-minimum-in-an-array/

8. Source Code

```
Arr = []

for i in range(20, 50):
    if i % 2 == 0:
        Arr.append(i)

def print_array():
    print("\nArray Elements:")
    for i in range(len(Arr)):
        print(f"{Arr[i]}")

def find_max():
    max_element = Arr[0]
    for i in range(1, len(Arr)):
        if Arr[i] > max_element:
            max_element = Arr[i]
    print("\nMaximum element in the array:", max_element)

def reversed_array():
    reversed_arr = Arr[::-1]
    print("\nReversed array:")
    for element in reversed_arr:
        print(element)

while True:
    print("\nChoose an option:")
    print("1. Display Element")
    print("2. Find Maximum Element")
    print("3. Reverse Array")
    print("4. Exit")

    choice = input("Enter your choice: ")

    if choice == "1":
        print_array()
    elif choice == "2":
        find_max()
    elif choice == "3":
        reversed_array()
    elif choice == "4":
        print("\nProgram terminated.")
        break
    else:
        print("\nInvalid. Please choose again!")

        break
    else:
        print("\nInvalid. Please choose again!")
```