MIDTERM EXAM SKILL-TEST	
Course Code: DSA 201L	**Program: BS CpE**
Course Title: DATA STRUCTURE AND ALGORITHM	**Date Performed: September 6, 2025**
Section: 2B	**Date Submitted: September 26, 2025**
Name: Junichiro H. Uy	**Instructor:** Engr. Maria Rizette M. Sayo

1.Objectives

- To write a python program that makes an array of integers less than 50, but not less than 20.
- To be able to display each integer along with its index number.
- To count the number of elements in the list.
- To count the number of odd and even integers in the list.

2. Discussion

Arrays are the most flexible data structure used in python, since it can hold elements of different types like integers, strings, floats, Booleans, and even another list. Secondly, arrays are dynamically resized, you can add or remove elements without having to declare its size beforehand. Lastly, it has different built-in functions like append, insert, pop and more we can use to manipulate the elements inside it.

In python, array is a collection of items stored in contiguous memory locations. Unlike list, python arrays require you to store only the same type of item all throughout the array, meaning if it contains an int, all elements must be int.

In order to use python arrays, you must import it:

import array as arr

And it also has different typcodes which indicates different element types like 'i' for integers:

a = arr.array('i', [1,2,3,4])

And you can also display its typcode:

a.typecode

Overall, python array is really memory efficient and easy to use specially for beginners like me.

3. Materials and Equipment

- My laptop
- Google Colab
- Github
- Microsoft office web

4. Procedure

1. Import array as arr
2. Initialize the array per the condition of integers less than 50 but not less than 20. I used the range function to do it faster.
3. I first added the function to display the integer along with its index number. To do that, I made a function with a parameter list. Then I had to use a for loop that reads the parameter's index number

and value in the enumerated parameter. Under that for loop, I used an f string to print each result.

4. Then I made a function that counts the length of the parameter, which is the array. I just used the len function of the array to get its count then printed it.
5. Lastly, I made a function that counts the number of odd numbers and even numbers inside the array. To track the count, first I had to initialize two variables each for odd and even as 0. Then I used a for loop to read the integer in the array then I added an if and else statement that reads if the modulo of the number is 1 or 0. If the modulo is 1, then it will += 1 to the odd variable, then if the modulo is 0 it will += to the even variable. After it is finished with the for loop, I just printed the odd and even variables.

5. Output

```
import array as arr
arr.typecodes

evenList = arr.array('i', range(20, 50))
```

Figure 1 Screenshot of program from google colab

```
displayAll(evenList)
displayCount(evenList)
displayOddEven(evenList)
```

Figure 2 Screenshot of program from google colab

This is the output for number 1 and 2 in procedures.

```
#a. Display the elements
def displayAll(list):
  for index, item in enumerate(list):
    print(f"Index {index}: {item}")

  print(f"\n{list}")
```

Figure 3 Screenshot of program from google colab

```
Index 0: 20
Index 1: 21
Index 2: 22
Index 3: 23
Index 4: 24
Index 5: 25
Index 6: 26
Index 7: 27
Index 8: 28
Index 9: 29
Index 10: 30
Index 11: 31
Index 12: 32
Index 13: 33
Index 14: 34
Index 15: 35
Index 16: 36
Index 17: 37
Index 18: 38
Index 19: 39
Index 20: 40
Index 21: 41
Index 22: 42
Index 23: 43
Index 24: 44
Index 25: 45
Index 26: 46
Index 27: 47
Index 28: 48
Index 29: 49

array('i', [20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49])
```

Figure 4 Screenshot of output from google colab

This is the screenshot of number 3 in procedures along with its output.

```python
#b. Count the number of elements
def displayCount(list):
  countNum = len(list)
  print(f"\nThere are {countNum} integers inside the array!")
```

Figure 5 Screenshot of program from google colab

```
There are 30 integers inside the array!
```

Figure 6 Screenshot of output from google colab

This is the screenshot of number 4 in procedures along with its output.

```python
#c. Count the number of Odd and Even integers
def displayOddEven(list):
  evenCount = 0
  oddCount = 0
  for number in list:
    if number % 2 == 1:
      oddCount += 1
    else:
      evenCount += 1

  print(f"\nOdd: {oddCount} \nEven: {evenCount}")
```

Figure 7 Screenshot of program from google colab

```
Odd: 15
Even: 15
```

Figure 8 Screenshot of output from google colab

This is the screenshot of number 5 in procedures along with its output.

6. Conclusion

In conclusion, this midterm skill test made me use different functions to manipulate an array. I can say that I have learned some of its function and I have deepened my understanding of for loops. If ever a future project requires me to use an array, I will be able to utilize it to utmost efficiency, and I would have a breeze.

Lab Activity Rubric

Criteria	Ratings						Pts
SO 7 PI 1 **Student Outcome 7.1** Acquire and apply new knowledge from outside sources. threshold: 4.8 pts	6 pts Excellent | Educational interests and pursuits exist and flourish outside classroom requirements,knowledge and/or experiences are pursued independently and applies knowledge learned into practice	5 pts Good | Educational interests and pursuits exist and flourish outside classroom requirements,knowledge and/or experiences are pursued independently	4 pts Satisfactory | Look beyond classroom requirements, showing interest in pursuing knowledge independently	3 pts Unsatisfactory | Begins to look beyond classroom requirements, showing interest in pursuing knowledge independently	2 pts Poor | Relies on classroom instruction only	1 pts Very Poor | No initiative or interest in acquiring new knowledge	6 pts
SO 7 PI 2 **Student Outcome 7.2** Learn independently threshold: 4.8 pts	6 pts Excellent | Completes an assigned task independently and practices continuous improvement	5 pts Good | Completes an assigned task without supervision or guidance	4 pts Satisfactory | Requires minimal guidance to complete an assigned task	3 pts Unsatisfactory | Requires detailed or step-by-step instructions to complete a task	2 pts Poor | Shows little interest to complete a task independently	1 pts Very Poor | No interest to complete a task independently	6 pts
SO 7 PI 3 **Student Outcome 7.3** Critical thinking in the broadest context of technological change threshold: 4.8 pts	6 pts Excellent | Synthesizes and integrates information from a variety of sources; formulates a clear and precise perspective; draws appropriate conclusions	5 pts Good | Evaluate information from a variety of sources; formulates a clear and precise perspective.	4 pts Satisfactory | Analyze information from a variety of sources; formulates a clear and precise perspective.	3 pts Unsatisfactory | Apply the gathered information to formulate the problem	2 pts Poor | Gather and summarized the information from a variety of sources but failed to formulate the problem	1 pts Very Poor | Gather information from a variety of sources	6 pts
SO 7 PI 4 **Student Outcome 7.4** Creativity and adaptability to new and emerging technologies threshold: 4.8 pts	6 pts Excellent | Ideas are combined in original and creative ways in line with the new and emerging technology trends to solve a problem or address an issue.	5 pts Good | Ideas are creative and adapt the new knowledge to solve a problem or address an issue	4 pts Satisfactory | Ideas are creative in solving a problem, or address an issue	3 pts Unsatisfactory | Shows some creative ways to solve the problem	2 pts Poor | Shows initiative and attempt to develop creative ideas to solve the problem	1 pts Very Poor | Ideas are copied or restated from the sources consulted	6 pts
							Total Points: 24