Student Name: Garv Khurana **UID:** 21BCS6615

Branch: AIT - CSE - AIML **Section/Group: 21AML - 9 - "A"**
Semester: 3rd **Date of Performance: 10-8-22**
Subject Name: Data Structures **Subject Code:** 21CSH-241

Program 1

1. **Aim/Overview of the practical:** To create an array of the size entered by the user and scan and print its content.

2. **Code:**

```c
#include <stdio.h>

#include <stdlib.h>

void arrayScanner(int *arr, int n){

    for (int i = 0; i < n; i++){

        scanf("%d", &arr[i]);

    }

}

void arrayPrinter(int *arr, int n){

    for (int i = 0; i < n; i++){

        printf("%d ", arr[i]);

    }

}
```

```c
int main(){

    int n;

    int *arr;

    printf("Enter the size of the array: ");

    scanf("%d", &n);

    printf("\n");

    arr = (int *)malloc(n * sizeof(int));

    printf("Enter the values of the Array\n\n");

    arrayScanner(arr, n);

    printf("Array is: ");

    arrayPrinter(arr, n);

}
```

3. Code Output:

```
Garv Khurana@LAPTOP-ANP8Q125 MIN
$ ./"arrayScanner&Printer.exe"
Enter the size of the array: 10

Enter the values of the Array

0 1 2 3 4 5 6 7 8 9
Array is: 0 1 2 3 4 5 6 7 8 9
```

Program 2

3. **Aim/Overview of the practical:** WAP to insert into an array.

4. **Code:**

```c
#include <stdio.h>

#include <stdlib.h>

void arrayScanner(int *arr, int length){

    for (int i = 0; i < length; i++){

        scanf("%d", &arr[i]);

    }

}

void arrayPrinter(int *arr, int length){

    for (int i = 0; i < length; i++){

        printf("%d ", arr[i]);

    }

}

void arrayInsertion(int *arr, int *length, int value, int position){

    for (int i = *length; i >= position; i--){

        arr[i + 1] = arr[i];

    }

    arr[position] = value;

    (*length)++;

}

int main(){

    int size;

    int length;

    int *arr;
```

```
    printf("Enter the size of the arra: ");

    scanf("%d", &size);

    printf("\n");

    arr = (int *)malloc(size * sizeof(int));

    int newValue;

    int position;

    printf("\n");

    printf("\nEnter the no. of elements you want to add initially: ");

    scanf("%d", &length);

    printf("\n");

    printf("Enter the values of the array: \n\n");

    arrayScanner(arr, length);

    printf("Array is: ");

    arrayPrinter(arr, length);

    printf("\n");

    printf("Enter the position you want to insert in: ");

    scanf("%d", &position);

    printf("\n");

    printf("\nEnter the value you want to insert: ");

    scanf("%d", &newValue);

    printf("\n");

    arrayInsertion(arr, &length, newValue, position - 1);

    printf("\nNew Array is: \n");

    arrayPrinter(arr, length);

}
```

3. Code Output:

```
Garv Khurana@LAPTOP-ANP8Q125 MINGW64 /d/Chandigarh Univers
$ ./"arrayInsertion.exe"
Enter the size of the arra: 10



Enter the no. of elements you want to add initially: 5

Enter the values of the array:

0 1 2 3 4
Array is: 0 1 2 3 4
Enter the position you want to insert in: 3


Enter the value you want to insert: 6


New Array is:
0 1 6 2 3 4
```

Program 3

5. **Aim/Overview of the practical:** Make a Menu-based program for array Printing, Scanning, and Insertion.

6. **Code:**

```c
int main(){

    int size;

    int length;

    int *arr;

    printf("Enter the size of the arra: ");

    scanf("%d", &size);

    printf("\n");

    arr = (int *)malloc(size * sizeof(int));

    int choice = 0;

    int newValue;

    int position;
```

```
    printf("\n");
    printf("\nEnter the no. of elements you want to add initially: ");
    scanf("%d", &length);
    printf("\n");
    printf("Enter the values of the array: \n\n");
    arrayScanner(arr, length);
    while (choice != 3){
        printf("\n\n");
        printf("****** Array Menu ******\n");
        printf("1. Display Array\n");
        printf("2. Insert an Element in the Array\n");
        printf("3. Exit\n");
        printf("\nEnter your Choice Number: ");
        scanf("%d", &choice);
        printf("\n");
        switch (choice){
        case 1:
            printf("\n");
            printf("Array Is: ");
            arrayPrinter(arr, length);
            printf("\n");
            break;
        case 2:
            printf("\nEnter the position you want to insert in: ");
```

```
            scanf("%d", &position);

            printf("\nEnter the value you want to insert: ");

            scanf("%d", &newValue);

            printf("\n");

            arrayInsertion(arr, &length, newValue, position - 1);

            printf("Successfully Inserted\n");

            break;

        }

    }

}
```

3. Code Output:

```
Garv Khurana@LAPTOP-ANP8Q125 MINGW64 /d/Chandigarh Unive
$ ./"menubased.exe"
Enter the size of the arra: 10



Enter the no. of elements you want to add initially: 5

Enter the values of the array:

0 1 2 3 4


****** Array Menu ******
1. Display Array
2. Insert an Element in the Array
3. Exit

Enter your Choice Number: 1


Array Is: 0 1 2 3 4


****** Array Menu ******
1. Display Array
2. Insert an Element in the Array
3. Exit

Enter your Choice Number: 2


Enter the position you want to insert in: 3

Enter the value you want to insert: 6

Successfully Inserted


****** Array Menu ******
1. Display Array
2. Insert an Element in the Array
3. Exit

Enter your Choice Number: 1


Array Is: 0 1 6 2 3 4


****** Array Menu ******
1. Display Array
2. Insert an Element in the Array
3. Exit

Enter your Choice Number: 3
```

Learning outcomes (What I have learned):

1. **Different operations on the Array Data Structure.**
2. **How to insert into an array**
3. **How to manipulate, scan, and print the values of an array.**

Evaluation Grid (To be created per the faculty's SOP and Assessment guideline):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.			
2.			
3.			