Assignment – 9th (Arrays in Java)

1. What do you mean by an Array?

Ans: - An array is a data structure that holds multiple values in a single unit, each identified by an index or a key. Arrays allow for efficient access, addition, and removal of elements, and are useful for organizing data in a way that makes it easy to perform operations on the data. In programming, arrays are typically implemented as contiguous blocks of memory, with each element stored in a specific memory location. This allows for fast access to elements in the array, as the memory locations can be calculated based on the index of the element.

2. How to create an Array?

Ans: - The process of creating an array can vary depending on the programming language you are using. In Java, you can create an array using the following syntax:

```
int arrayName[] = new int[arraySize];
```

Here, arrayName is the name you want to give to your array, int is the data type of the elements you want to store in the array, and arraySize is the number of elements the array should be able to hold.

3. Can we change the size of an array at runtime?

Ans: - The size of an array is typically fixed at the time of creation and cannot be changed afterwards in most programming languages like C, Java, and C++. Once the size of an array is defined, you cannot add or remove elements from it. This means that if you need to change the size of an array, you must create a new array with the desired size and copy the elements from the old array to the new one.

In Python programming language we can change the size of an array at runtime.

4. Can you declare an array without assigning the size of an array?

Ans: - No, in most programming languages, you need to specify the size of an array when you declare it. The size of the array determines how many elements it can hold. This is because arrays are usually implemented as contiguous blocks of memory, so the size of the array determines the amount of memory that is reserved for the array.

In Python programming language we can declare an array without specifying the size, and the size of the array can change dynamically at runtime.

5. What is the default value of Array?

Ans: - In Java, the default value of an array depends on the type of the elements that the array contains.

For example, if the array is an array of primitive data types like int, the default value of the elements in the array will be 0. If the array is an array of floating-point numbers like float, the default value of the elements in the array will be 0.0. If the array is an array of characters like char, the default value of the elements in the array will be the null.

For reference types like objects, the default value of the elements in the array will be null. This means that the elements of the array do not refer to any object in memory.

The default values of an array are assigned when the array is created, so it's a good practice to initialize the elements of the array to a specific value before using them in your code.

6. What is a 1D array with an example?

Ans: - A 1D array, also known as a one-dimensional array, is a linear collection of elements of the same data type. In other words, a 1D array is a single row of elements, where each element can be accessed by its index.

Example of a 1D array in Java:

```
public class Main {
	public static void main(String[] args) {

		int num[] = new int[5];

		// initialize the elements of the array
		num[0] = 1;
		num[1] = 2;
		num[2] = 3;
		num[3] = 4;
		num[4] = 5;

		// print the elements of the array
		for(int i=0; i<num.length; i++)
		{
			System.out.println(num[i]);
		}
	}
}
```

7. Write a program on a 2D array?

Ans: - Program of 2D array:

```
public class Main {
	public static void main(String[] args) {
		int num[][] = {
				{1, 2, 3},
				{4, 5, 6},
				{7, 8, 9}
				};
		// print the 2D array
		System.out.println("2D Array is:");
		for(int i=0; i<num.length; i++){
			for(int j=0; j<num[i].length; j++){
				System.out.print(num[i][j] + " ");
			}
			System.out.println();
		}
	}
}
```