Practical -18

Aim:- Write a Program for a basic hash function in a programming language of your choice. Demonstrate its usage to store and retrieve key-value pairs.

Algorithm :-

1. **Initialization**:
    - Create a **HashMap<String, Integer>** to store key-value pairs (country names and populations).
2. **Add Key-Value Pair (put)**:
    - To add a new key-value pair:
        - Use **map.put(key, value)** to insert the key and its corresponding value into the map.
3. **Update Value**:
    - To update the value associated with an existing key:
        - Use **map.put(key, newValue)** to overwrite the existing value.
4. **Remove Key-Value Pair (remove)**:
    - To remove a key-value pair:
        - Use **map.remove(key)** to delete the entry associated with the specified key.
5. **Check for Key Existence (containsKey)**:
    - To check if a key exists in the map:
        - Use **map.containsKey(key)** which returns **true** if the key is present, otherwise **false**.
6. **Retrieve Value (get)**:
    - To retrieve the value associated with a key:

- Use **map.get(key)** which returns the value if the key exists, or **null** if it does not.

7. **Display All Key-Value Pairs**:
   - To display all entries in the map:
     - Iterate through **map.keySet()** and print each key along with its corresponding value.
8. **Array Operations** (Optional):
   - Create an array and demonstrate accessing its elements using both a traditional for loop and an enhanced for loop.

Program:-

```
import java.util.HashMap;


public class Hashh {
    public static void main(String[] args) {
        // Create a HashMap to store country populations
        HashMap<String, Integer> map = new HashMap<>();

        // Adding key-value pairs
        map.put("India", 120);
        map.put("USA", 30);
        map.put("China", 150);
        System.out.println("Initial Population Map: " + map);

        // Updating a value
```

```
        map.put("USA", 35);
        System.out.println("Updated Population of USA: " + map.get("USA")); // Output: 35

        // Removing a key-value pair
        map.remove("China");
        System.out.println("Population of China after removal: " + map.get("China")); // Output: null

        // Searching for a key
        if (map.containsKey("China")) {
            System.out.println("Key 'China' is present in the map.");
        } else {
            System.out.println("Key 'China' is not present in the map.");
        }

        // Getting values of keys
        System.out.println("Population of India: " + map.get("India")); // Key exists
        System.out.println("Population of Indonesia: " + map.get("Indonesia")); // Key doesn't exist

        // Displaying all key-value pairs
        System.out.println("All populations in the map:");
        for (String country : map.keySet()) {
            System.out.println(country + ": " + map.get(country));
        }
```

```
        // Example of an array
        int arr[] = {12, 15, 18};
        System.out.println("Array elements:");
        for (int i = 0; i < arr.length; i++) {
            System.out.print(arr[i] + " ");
        }
        System.out.println();

        // Enhanced for loop for array
        System.out.println("Array elements using enhanced for loop:");
        for (int val : arr) {
            System.out.print(val + " ");
        }
        System.out.println();
    }
}
```

```
Initial Population Map: {USA=30, China=150, India=120}
Updated Population of USA: 35
Population of China after removal: null
Key 'China' is not present in the map.
Population of India: 120
Population of Indonesia: null
All populations in the map:
USA: 35
India: 120
Array elements:
12 15 18
Array elements using enhanced for loop:
12 15 18
PS C:\Users\HP\OneDrive\Desktop\CC Program>
```