MAPS

1. Tasks
2. Develop a java class with a instance variable M1 (HashMap) create a method saveCountryCapital(String CountryName, String capital) , the method should add the passed country and capital as key/value in the map M1 and return the Map (M1). Key- Country Value - Capital India Delhi Japan Tokyo
3. Develop a method getCapital(String CountryName) which returns the capital for the country passed, from the Map M1 created in step 1.
4. Develop a method getCountry(String capitalName) which returns the country for the capital name, passed from the Map M1 created in step 1.
5. Develop a method which iterates through the map M1 and creates another map M2 with Capital as the key and value as Country and returns the Map M2.
6. Develop a method which iterates through the map M1 and creates an ArrayList with all the Country names stored as keys. This method should return the ArrayList.

**CODE**

*import* java.util.*\**;

*public* class CountryCapital {

*private* HashMap<String, String> M1 = new HashMap<>();

***// Method to save Country and Capital into the map***

*public* HashMap<String, String> saveCountryCapital(String countryName, String capital) {

        M1.put(countryName, capital);

        return M1;

    }

***// Method to get capital by country name***

*public* String getCapital(String countryName) {

        return M1.get(countryName);

    }

***// Method to get country by capital name***

*public* String getCountry(String capitalName) {

        for (Map.Entry<String, String> entry : M1.entrySet()) {

            if (entry.getValue().equalsIgnoreCase(capitalName)) {

                return entry.getKey();

            }

        }

        return null;

    }

***// Create another map M2 with capital as key and country as value***

*public* HashMap<String, String> reverseMap() {

        HashMap<String, String> M2 = new HashMap<>();

        for (Map.Entry<String, String> entry : M1.entrySet()) {

            M2.put(entry.getValue(), entry.getKey());

        }

        return M2;

    }

***// Get all country names into an ArrayList***

*public* ArrayList<String> getAllCountries() {

        return new ArrayList<>(M1.keySet());

    }

*public* *static* *void* main(String[] args) {

        CountryCapital cc = new CountryCapital();

        cc.saveCountryCapital("India", "Delhi");

        cc.saveCountryCapital("Japan", "Tokyo");

        System.*out*.println("Capital of India: " + cc.getCapital("India"));

        System.*out*.println("Country with capital Tokyo: " + cc.getCountry("Tokyo"));

        HashMap<String, String> M2 = cc.reverseMap();

        System.*out*.println("Reversed Map (Capital -> Country): " + M2);

        ArrayList<String> countryList = cc.getAllCountries();

        System.*out*.println(countryList);

    }

}

**OUTPUT:**

Capital of India: Delhi

Country with capital Tokyo: Japan

Reversed Map (Capital -> Country): {Delhi=India, Tokyo=Japan}

[Japan, India]

1. Write a program that will have a Properties class object which is capable of storing some States of India and their Capital. Use an Iterator to list all the elements stored in the Properties.

**CODE**

*import* java.util.*\**;

*public* class FindKeyValue {

    HashMap<String, String> data;

*public* FindKeyValue() {

        data = new HashMap<>();

    }

*public* HashMap<String, String> addValues(String key, String value) {

        data.put(key, value);

        return data;

    }

*// Check if a value exists in the map*

*public* *boolean* isValueExist(String key) {

        return data.containsKey(key);

    }

*// Check if a key exists in the map*

*public* String isKeyExist(String value) {

        for (Map.Entry<String, String> entry : data.entrySet()) {

            if (entry.getValue().equalsIgnoreCase(value)) {

                return entry.getKey();

            }

        }

        return null;

    }

*public* *static* *void* main(String[] args) {

        FindKeyValue obj = new FindKeyValue();

        obj.addValues("India", "Delhi");

        obj.addValues("Japan", "Tokyo");

        System.*out*.println("Is key 'India' present? " + obj.isValueExist("India"));

        System.*out*.println("Is value 'Tokyo' mapped to any key? -> " + obj.isKeyExist("Tokyo"));

        Set<Map.Entry<String, String>> entry = obj.*data*.entrySet();

        Iterator<Map.Entry<String, String>> iterator = entry.iterator();

        while (iterator.hasNext()) {

            Map.Entry<String, String> current = iterator.next();

            System.*out*.println("Key: " + current.getKey() + ", Value: " + current.getValue());

        }

    }

}

**OUTPUT:**

Is key 'India' present? true

Is value 'Tokyo' mapped to any key? -> Japan

Key: Japan, Value: Tokyo

Key: India, Value: Delhi

1. Write a program that will have a Properties class object which is capable of storing some States of India and their Capital. Use an Iterator to list all the elements stored in the Properties.

**CODE**

*import* java**.**util**.***\****;**

*public* class StateCapitalProperties {

*public* *static* *void* main(String[] args) {

        Properties statesAndCapitals = new Properties();

        statesAndCapitals**.**setProperty("Andhra Pradesh"**,** "Amaravati")**;**

        statesAndCapitals**.**setProperty("Telangana"**,** "Hyderabad")**;**

        statesAndCapitals**.**setProperty("Karnataka"**,** "Bengaluru")**;**

        statesAndCapitals**.**setProperty("Maharashtra"**,** "Mumbai")**;**

        statesAndCapitals**.**setProperty("Tamil Nadu"**,** "Chennai")**;**

        Set**<**Map**.**Entry**<**Object**,** Object**>>** entrySet **=** statesAndCapitals**.**entrySet()**;**

        Iterator**<**Map**.**Entry**<**Object**,** Object**>>** iterator **=** entrySet**.**iterator()**;**

        System**.***out***.**println("List of States and their Capitals:")**;**

        while (iterator**.**hasNext()) {

            Map**.**Entry**<**Object**,** Object**>** entry **=** iterator**.**next()**;**

            System**.***out***.**println("State: " **+** entry**.**getKey() **+** ", Capital: " **+** entry**.**getValue())**;**

        }

    }

}

**OUTPUT:**

List of States and their Capitals:

State: Telangana, Capital: Hyderabad

State: Karnataka, Capital: Bengaluru

State: Andhra Pradesh, Capital: Amaravati

State: Tamil Nadu, Capital: Chennai

State: Maharashtra, Capital: Mumbai

1. Create a Collection “ContactList” using HashMap to store name and phone number of contacts added. The program should use appropriate generics (String, Integer) and have the following abilities:

a) Check if a particular key exists or not.

b) Check if a particular value exists or not.

c) Use Iterator to loop through the map.

**CODE**

*import* java.util.*\**;

*public* class ContactList {

    HashMap<String, Integer> contacts;

*public* ContactList() {

        contacts = new HashMap<>();

    }

*public* *void* addContact(String name, Integer phoneNumber) {

        contacts.put(name, phoneNumber);

    }

*public* *boolean* isNameExist(String name) {

        for (String key : contacts.keySet()) {

            if (key.equalsIgnoreCase(name)) {

                return true;

            }

        }

        return false;

    }

*public* *boolean* isPhoneExist(Integer number) {

        return contacts.containsValue(number);

    }

*public* *void* displayContacts() {

        Iterator<Map.Entry<String, Integer>> iterator = contacts.entrySet().iterator();

        while (iterator.hasNext()) {

            Map.Entry<String, Integer> entry = iterator.next();

            System.*out*.println("Name: " + entry.getKey() + ", Phone: " + entry.getValue());

        }

    }

*public* *static* *void* main(String[] args) {

        ContactList contactList = new ContactList();

        contactList.addContact("Vinnu", 987654321);

        contactList.addContact("Abde", 912345678);

        contactList.addContact("Chinnu", 998877665);

*// Checking for the key*

        System.*out*.println("Is 'Vinnu' in contacts? " + contactList.isNameExist("Vinnu"));

*// Check for the value*

        System.*out*.println("Is number 912345678 present? " + contactList.isPhoneExist(912345679));

        contactList.displayContacts();

    }

}

**OUTPUT:**

Is 'Vinnu' in contacts? true

Is number 912345678 present? true

Name: Abde, Phone: 912345678

Name: Chinnu, Phone: 998877665

Name: Vinnu, Phone: 987654321

1. Implement the assignment 1 using TreeMap

*import* java**.**util**.***\****;**

*public* class CountryCapitalTreeMap {

    TreeMap<String, String> M1 = new TreeMap<>();

*public* Map<String, String> saveCountryCapital(String CountryName, String capital) {

        M1.put(CountryName, capital);

        return M1;

    }

*public* String getCapital(String CountryName) {

        return M1.get(CountryName);

    }

*public* String getCountry(String capitalName) {

        for (Map.Entry<String, String> entry : M1.entrySet()) {

            if (entry.getValue().equalsIgnoreCase(capitalName)) {

                return entry.getKey();

            }

        }

        return null;

    }

    public Map<String, String> reverseMap() {

        TreeMap<String, String> M2 = new TreeMap<>();

        for (Map.Entry<String, String> entry : M1.entrySet()) {

            M2.put(entry.getValue(), entry.getKey());

        }

        return M2;

    }

*public* ArrayList<String> getAllCountries() {cls

        return new ArrayList<>(M1.keySet());

    }

*public* *static* *void* main(String[] args) {

        CountryCapitalTreeMap obj = new CountryCapitalTreeMap();

        obj.saveCountryCapital("India", "Delhi");

        obj.saveCountryCapital("Japan", "Tokyo");

        System.*out*.println(obj.getCapital("India"));

        System.*out*.println(obj.getCountry("Tokyo"));

        System.*out*.println(obj.reverseMap());

        System.*out*.println(obj.getAllCountries());

    }

}

**OUTPUT:**

Delhi

Japan

{Delhi=India, Tokyo=Japan}

[India, Japan]

1. Implement assignment 1 using HashTable

**CODE**

*import* java.util.*\**;

*public* class CountryCapitalHashtable {

    Hashtable<String, String> M1 = new Hashtable<>();

*public* Map<String, String> saveCountryCapital(String CountryName, String capital) {

        M1.put(CountryName, capital);

        return M1;

    }

*public* String getCapital(String CountryName) {

        return M1.get(CountryName);

    }

*public* String getCountry(String capitalName) {

        for (Map.Entry<String, String> entry : M1.entrySet()) {

            if (entry.getValue().equalsIgnoreCase(capitalName)) {

                return entry.getKey();

            }

        }

        return null;

    }

*public* Map<String, String> reverseMap() {

        Hashtable<String, String> M2 = new Hashtable<>();

        for (Map.Entry<String, String> entry : M1.entrySet()) {

            M2.put(entry.getValue(), entry.getKey());

        }

        return M2;

    }

*public* ArrayList<String> getAllCountries() {

        return new ArrayList<>(M1.keySet());

    }

*public* *static* *void* main(String[] args) {

        CountryCapitalHashtable obj = new CountryCapitalHashtable();

        obj.saveCountryCapital("India", "Delhi");

        obj.saveCountryCapital("Japan", "Tokyo");

        System.*out*.println(obj.getCapital("India"));

        System.*out*.println(obj.getCountry("Tokyo"));

        System.*out*.println(obj.reverseMap());

        System.*out*.println(obj.getAllCountries());

    }

}

**OUTPUT:**

Delhi

Japan

{Delhi=India, Tokyo=Japan}

[India, Japan]