Introduction to Java week#8

07/07/2023

week	Topic
1	JAVA IDE (NetBean) Installation ,Configuration and Compile
2	Basic structure of Java ,Data & Variable type, operator & basic logic
3	Function(Method) create & calling, Input & output
4	Loop statement ,Array variable
5	Object-oriented programming (OOP),Class & Object, Encapsulation
6	Inheritance, Polymorphism, Interfaces
7	Packages, Access Modifiers(Public ,Protected ,Private class)
8	Collections (Array list, HashMap, Stack)
9	Exception
10	Woking with files(Read, Write)
11	Thread Programing

Collection

Any group of individual objects which are represented as a single unit is known as a collection of objects.

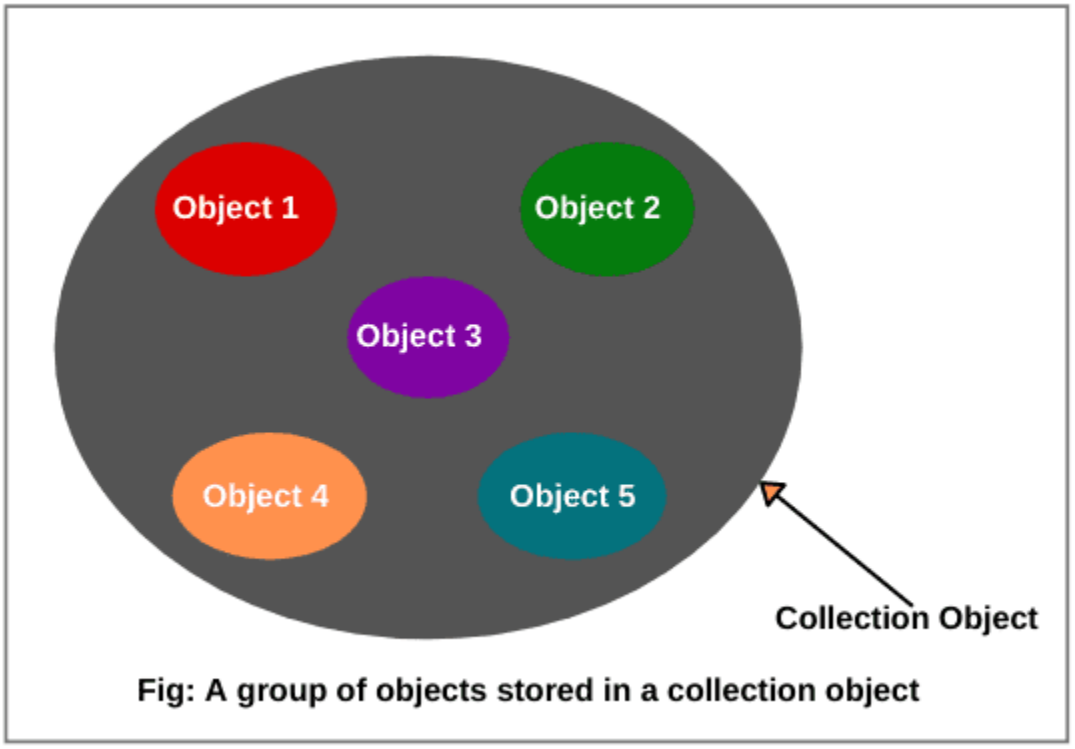


Fig: A group of objects stored in a collection object

Collection

Example types of collection

1) Stack

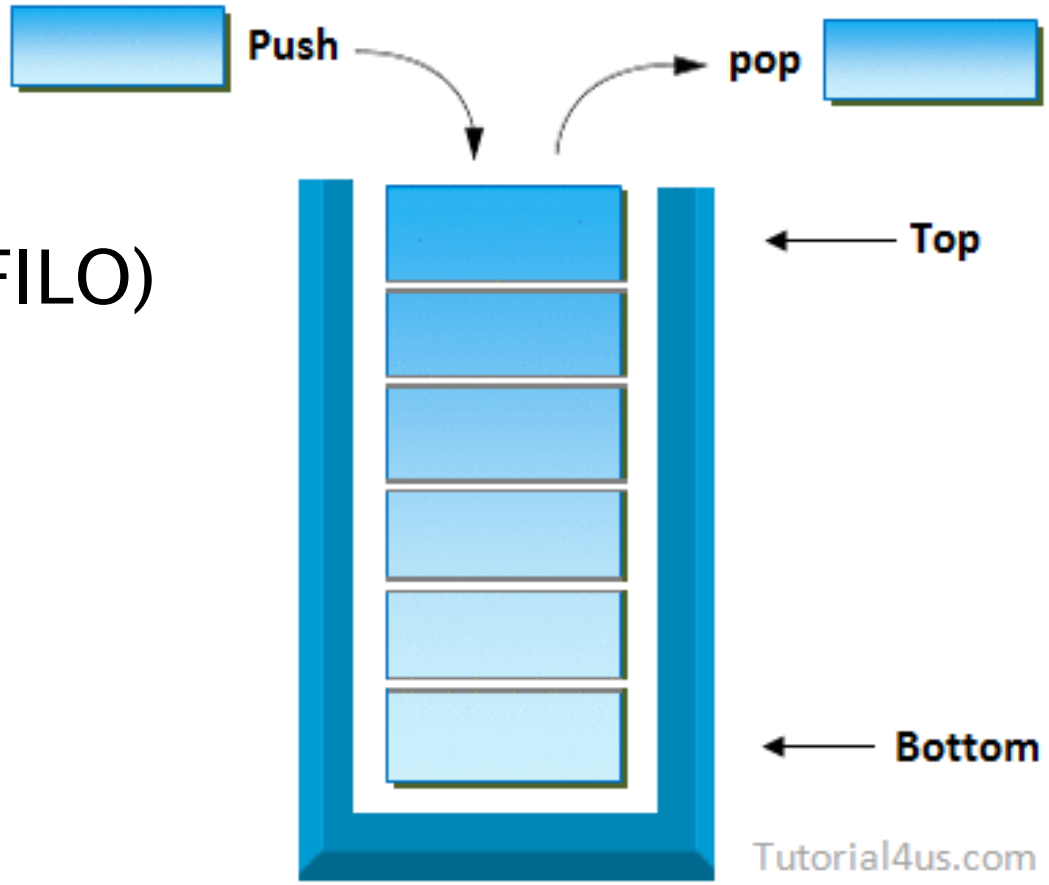
2) Array List

3) Hash Map

Collection

Stack

"First In -Last Out" (FILO)



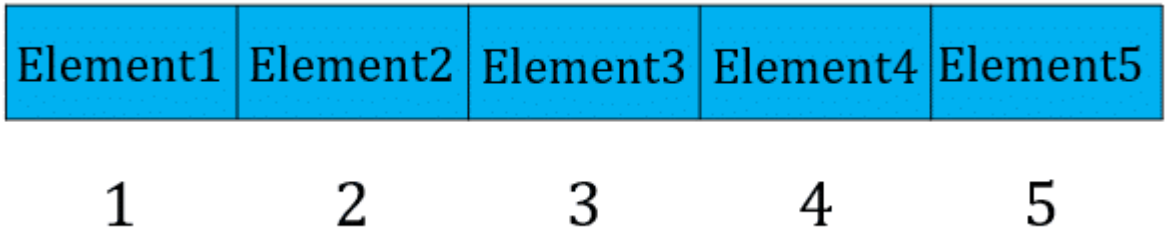
Collection – Stack

```
import java.util.Stack;

public class StackExample {
    public static void main (String[] args) {
        Stack<String> fruit = new Stack<>();

        // Add four fruits to stack
        fruit.push("Apple");
        fruit.push("Banana");
        fruit.push("Melon");
        fruit.push("Peach");

        System.out.println("Pop " + fruit.pop() + " from stack");
        System.out.println("Pop " + fruit.pop() + " from stack");
        System.out.println("Pop " + fruit.pop() + " from stack");
        System.out.println("Pop " + fruit.pop() + " from stack");

        if (fruit.isEmpty()) {
                System.out.println("Stack is empty");
        }
    }
}
```

Collection

Array List

is a dynamic data structure. It also contains elements of **the same type**. Here we **do not need to specify the size** of the list.



Collection- ArrayList

Array vs ArrayList

Array	ArrayList

Declaration Insertion Access Removal

```
Cat[] catArray;
catArray = new Cat[10];

catArray[0] = moggy1;
catArray[1] = moggy2;

callMethodOn(catArray[1]);

catArray[0] = null;
```

```
ArrayList catAList;
catAList = new ArrayList();

catAList.add(moggy1);
catAList.add(moggy2);

callMethodOn(catAList.get(1));

catAList.remove(moggy1);
```

Collection- ArrayList

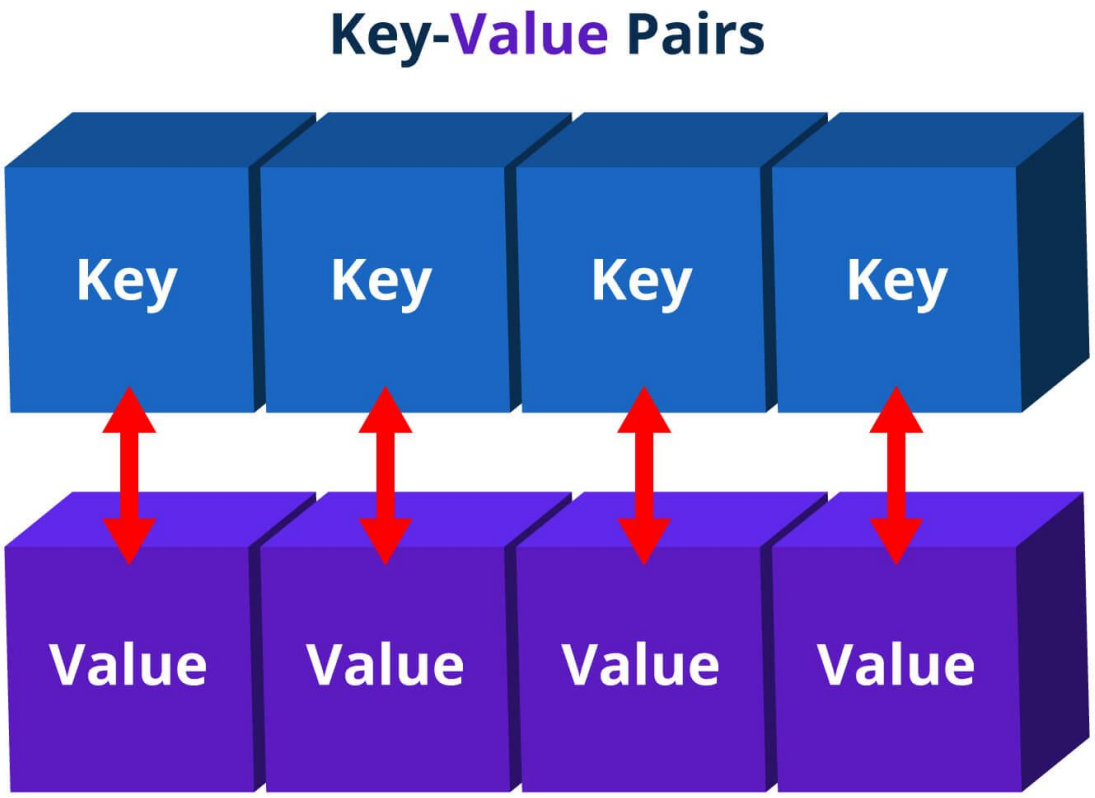
```
import java.util.ArrayList;

public class ArrayListExample {
    public static void main (String[] args) {
        ArrayList<String> names = new ArrayList<String>();
        names.add("Mateo");
        names.add("Danny");
        names.add("Joe");
        names.add("Alex");


        System.out.println(names.size() + " people in the list");
        // Access list through it index
        System.out.println("name[0] = " + names.get(0));
        System.out.println("name[1] = " + names.get(1));
        // Iterate through ArrayList usign foreach
        for (String name: names) {
                System.out.print(name + " ");
        }
        System.out.println();
```

```
        // Check if the list contain Mateo
        if (names.contains("Mateo")) {
                System.out.println("Mateo is in the list");
        }else {
                System.out.println("Mateo is not in the list");
        }
        // Get Danny's index
        int dannyIndex = names.indexOf("Danny");
        System.out.println("Index of Danny is " + dannyIndex);
        // Change Danny to Max
        names.set(dannyIndex, "Max");
        // Remove Matteo from the list
        names.remove(“Matteo");
        // Iterate through ArrayList usign foreach
        for(String name: names) {
                System.out.print(name + " ");
        }
        // Clear all list data
        names.clear();
        if(names.isEmpty()) {
                System.out.println("List is now empty");
        }
    }
}
```

Collection

Hash Map

HashMap in Java stores the data in (Key, Value) pairs

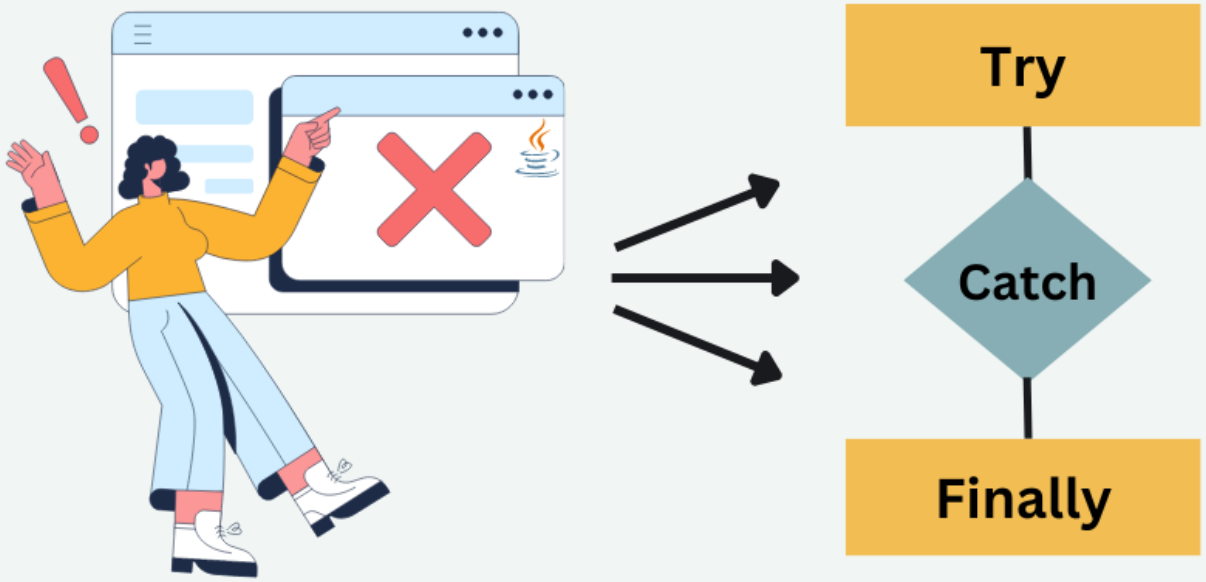


Collection- HashMap

```
import java.util.HashMap;

public class HashMapExample {
     public static void main (String[] args) {
          HashMap<String, String> country = new HashMap<>();
          country.put("de", "German");
          country.put("th", "Thailand");
          country.put("us", "United State");
          country.put("tr", "Turkey");
          System.out.println("Map size = " + country.size());
          System.out.println("de = " + country.get("de"));
          System.out.println("th = " + country.get("th"));
          System.out.println("th = " + country.get("uk"));
          System.out.println("Iterate over each Entry in HashMap");
          for (HashMap.Entry<String, String> entry : country.entrySet()) {
                    System.out.println(entry.getKey() + " = " + entry.getValue());
          }
          country.remove("tr");
          if(country.containsKey("tr")) {
                    System.out.println("Turkey exist in the map");
          } else {
                    System.out.println("Turkey does not exist in the map");
          }
          country.clear();
          System.out.println("Map size = " + country.size());
     }
}
```

Exception

The **Exception Handling in Java** is one of the powerful *mechanism to handle the runtime errors* so that the normal flow of the application can be maintained



Java Exception Handling

atatus

Exception

```
try {
      // try to do something
} catch (Exception1 ex1) {
      // handle for exception 1
}

...

} catch (ExceptionN exN) {
      // handle for exception N
} finally {
      // Always proceed this block whether
      // an exception is thrown or not
}
```

Exception

```
import java.util.Scanner;

public class TestException1 {
   public static void main (String[] args) {

      Scanner reader = new Scanner(System.in);
      int x;
      System.out.println("Please enter a number ");
      System.out.print("Enter number: ");
      x = reader.nextInt();
      System.out.println("Your number is " + x);

   }
}
```

Exception

```
import java.util.InputMismatchException;
import java.util.Scanner;

public class TestException1 {
    public static void main (String[] args) {

        Scanner reader = new Scanner(System.in);
        int x;
        System.out.println("Please enter a number ");

        try{
                System.out.print("Enter number: ");
                x = reader.nextInt();
                System.out.println("Your number is " + x);

        }catch(InputMismatchException ex) {
                System.out.println("Exception occurred: " + ex);
        }
    }
}
```

```java
public class TestException1 {
    public static void main (String[] args) {

        Scanner reader = new Scanner(System.in);
        int x;
        System.out.println("Please enter a number ");
        try{
                System.out.print("Enter number: ");
                x = reader.nextInt();
                System.out.println("Your number is " + x);

        }catch (InputMismatchException ex) {
                System.out.println("Exception occurred: " + ex);
        }finally {
            try {
                if (reader != null) {
                        reader.close();
                }
            }catch (IOException e) {
                 System.out.println("Exception occurred: " + e); }
        }
    }
}
```

Assignments

ให้ลองสร้างโปรแกรมที่ทำการรับค่า และ แสดงค่าจาก HashMap ตาม keyword ที่ผู้ใช้งานอินพุตเข้ามา และมีการทำ Exception Handling ในโปรแกรม

Thank you