Assignment – 3 (Generics and Collections)

Subject: CSW2(CSE3141)

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Branch: CSE

Section: 036

Q1. Write a program to create a Student class that has members, name, roll number, and age. Design the Student class in such a way that it can take the roll number as an integer or string. Create a driver class that creates student objects and invokes the methods.

Q2. Write a program to create a Book class with member variables bookId, bookName, and price. Add the respective method and constructor to it. Create a driver class in that class and create two book objects. Compare the book objects according to their price. Print the details of the book objects.

Note: Override toString and equals method.

Q3. Write a program to create a Car class with member variables model, color, and speed. Add the respective method and constructor to it. Create a driver class in that class and create two car objects. Compare the car objects according to their speed and print the details of the car that has a greater speed.

Note: Override compareTo method of Comparable interface.

Q4. Write a program to create a Student class with members name, rn, and totalMark. Create an array of student objects and search a student object using linear search from the array.

Note: Override compareTo method of Comparable interface.

Q5. Write a program to create a Student class with members name, rn, and total mark. Create an array of student objects and sort it using Bubble sort according to its rn.

Note: Override compareTo method of Comparable interface.

Q6. Write a program to create an Animal class with member variables name, color, types (pet/wild). Override the hashCode method to print the unique id for the object. Create the objects of the Animal class and print its hashcode.

Q7. Create a generic class Pair<K,V> with private variables key and value. The class Pair should define a parameterised constructor and getter and setter methods for these attributes. After addition of objects, the main class should retrieve and print the pair of key and value.

Q8. Write a Java code snippet that comprises of a User class and an ArrayListUser class. The User class should define private fields for name and age, along with a parameterized constructor and getter/setter methods for these attributes. Create an ArrayListUser class of User objects. After addition of objects, the ArrayListUser class should retrieve and print the name and age of users. Then, it should sort the user according to age using getter methods and print the updated array list of users.

Q9. Write a Java code snippet that comprises of a Car class and a CarApp class. The Car class should define private fields for ModalNo(int), name(string) and stock(int). Define a parameterised constructor and override the compareTo method as public int compareTo(Car car) to sort the car on basis of the total number of stock. Create an ArrayList of Car objects and print the updated the sorted list.

For example the list of sorted Car Objects

2013 creta 10

2020 MG 13

2018 Kia 20

2017 Audi 45

2015 BMW 55

Q10. Create a class Student having member variable name, age, and mark and required get and set methods. Create a LinkedList of Student type and perform the below operation on it.

(a.) Display the list

(b.) Ask the user to enter a Student object and print the existence of the object. Specify is the object is search according to reference or contain.

(c.) Remove a specified Student object.

(d.) Count the number of object present in the list.

(e.)Override equals method checking if the two Student objects share all the same values.

Q11. Create a Class Book that has id, name, author and quantity for each book issued. The Book class should define a parameterised constructor. Design a class Library that create a HashMap of books which contains an entry of key as Integer and value as Book object. Instantiate atleast two Book objects and display the collection of books in the HashMap. Use proper method of HashMap class to return the following things

(a.)Check if a particular book name is present in the map

(b.) remove the value associated with a particular key value which will remove the book entry.

Q12. Write a program to create a TreeSet of Integer type and perform the below operation on it.

(a.) Display the TreeSet

(b.) Ask the user to enter a number and search that number is it present in the list or not.

(c.) Remove an element from tree.

Q13. Write a java code that comprises of a class Address, having member variable plot no, at, post and required parameterised constructor. Create a Tree map having key as name of a person and value as address. Insert required key and value in the created tree map and use an iterator to display it.

Q14. Find if two strings are anagrams, an anagram is a word or phrase formed by reordering the letters of another word or phrase. Declare two strings str1 and str2 and initialize. Create a HashMap<Character, Integer> and use methods containsKey() ,put() ,get() to check the strings.

Q15. Given an array of integers, print the repeating integers in the array with the help of a HashSet.

Q16. In given large string, find the most occurring words in the string.

Hint:-

a. Create a Hashtable which will keep track of <word, frequency>

b. Iterate through the string and keep track of word frequency by inserting into Hash-Table.

c. When we have a new word, we will insert it into the Hashtable with frequency 1. For all repetition of the word, we will increase the frequency.

d. We can keep track of the most occurring words whenever we are increasing the frequency we can see if this is the most occurring word or not.

Q17. Given an unsorted array of integers from 1 to 10, find smallest positive number missing in the array. Use a hash map HashMap<Integer, Integer> to keep track of elements.

Q18. Declare an array of integers. int[] arr = {1,2,10,8,7,3,4,6,5,9};. Then create a min heap of elements from the array using Priority Queue class. Again Dequeue elements of Priority Queue using appropriate methods.