DSA Week 17 activities

This week, you are required to complete two questionnaires and two labs.

a. In this print out, answer all Week 17 questions.
b. Also, in this print out, complete Week 17 lab 1 & 2 using the lab computers.

Note: You can complete the activities in any order, however, make afford to complete and understand everything which prepares you for well for the Final Exam.

DSA Week 17 Questions

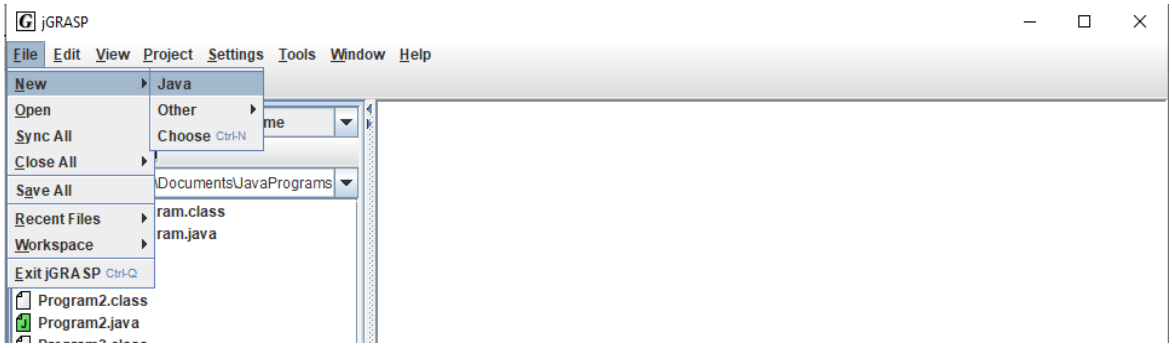
1. What is a Map ADT?

2. Discuss the get(k), put(k,v), remove(k) and isEmpty() methods used with Map ADT.

DSA Week 17 Lab Activity (Week17Lab1)

Using the lab computers create the following Java program using jGrasp!

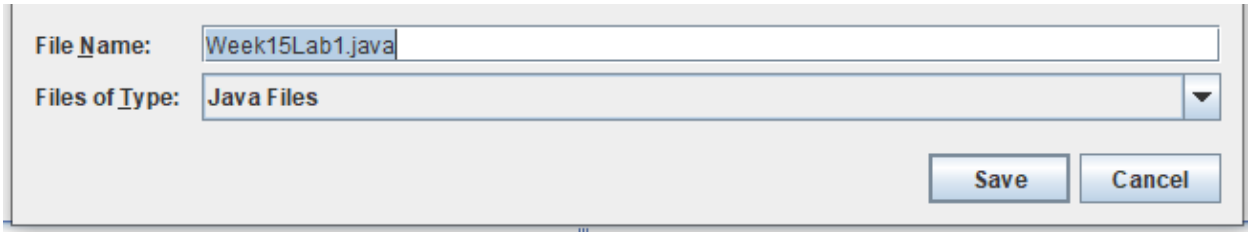
Step 1: Login to your lab computer and create a new java file in jGrasp.



Step 2: When the window below appears. Type the following code into jGrasp.

```java
/* DSA Week 15 Lab 1 */

import java.util.HashMap;
import java.util.Map;

public class Week15Lab1 {

   public static void main(String[] args) {
      // Create a Map to store course codes with index keys
      Map<Integer, String> itiCourses = new HashMap<>();

      // Simulate "pushing" elements with incremental keys
      itiCourses.put(0, "DIT");
      itiCourses.put(1, "DHRM");
      itiCourses.put(2, "DACC");
      itiCourses.put(3, "DICT");

      // Get the top element (the last inserted one)
      int topKey = itiCourses.size() - 1;
      String topElement = itiCourses.get(topKey);
      System.out.println("Top element: " + topElement);

      // Check if the map is empty
      if (itiCourses.isEmpty()) {
         System.out.println("Map is empty");
      } else {
         // Print the contents of the map
         System.out.print("Map contents: " + itiCourses);
      }
   }
}
```

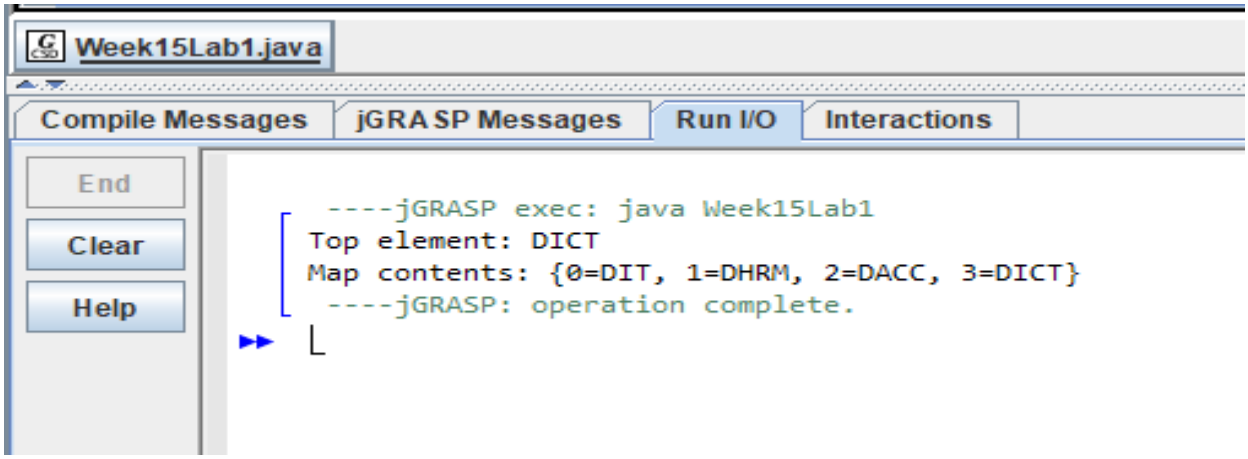
Step 3: Go to **file/save** to save your java program as **Week17Lab1**



Step 4: After saving, compile (**click on compile icon or on your keyword hold Ctrl + B**) to check for syntax errors.

Step 5: If compiling is successfully then run (**click on the find and run main method icon or on your keyboard hold Ctrl + R**) your program.

Step 6: If run is successful then you should see the following output in the console

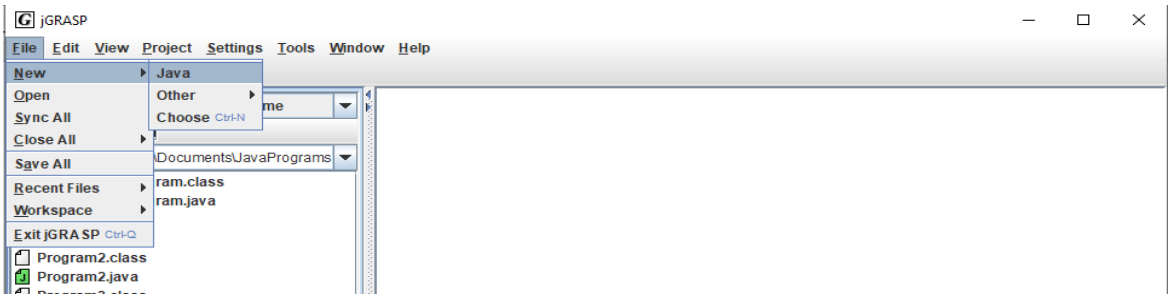


Step 7: Week17Lab1 Completed! Save your file for future Java lab activities.

DSA Week 17 Lab Activity (Week17Lab2)

Using the lab computers create the following Java program using jGrasp!

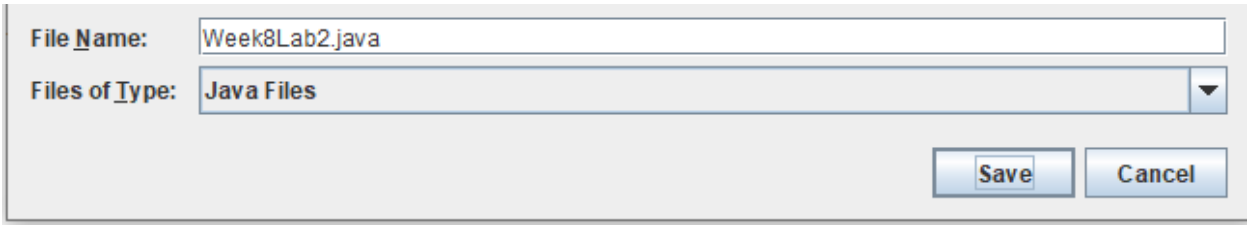
Step 1: Login to your lab computer and create a new java file in jGrasp.



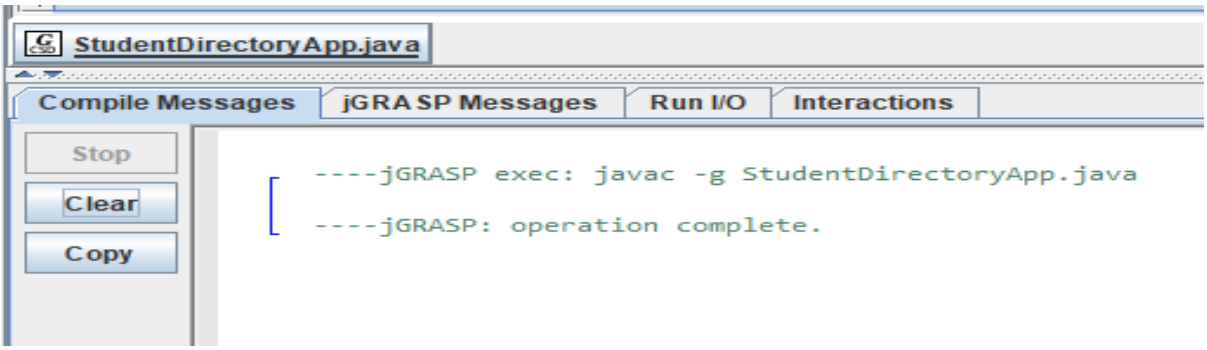
Step 2: Type the following code into jGrasp.

```java
/* DSA Week 15 Final Lab */

import java.util.HashMap;
import java.util.Map;
import java.util.Scanner;

public class StudentDirectoryApp {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        //use map <hashmap> data structure to store data
        Map<String, String> studentDirectory = new HashMap<>();

        while (true) {
            System.out.println("\n=== Student Directory Menu ===");
            System.out.println("1. Add a Student");
            System.out.println("2. View All Students");
            System.out.println("3. Search by StudentID#");
            System.out.println("4. Remove a Student");
            System.out.println("5. Exit application");
            System.out.print("Choose an option from the Menu (1-5): ");
            int choice = scanner.nextInt();
            scanner.nextLine();

            switch (choice) {
                case 1:
                    System.out.print("Enter a studentID#: ");
                    String id = scanner.nextLine();
                    System.out.print("Enter a student name: ");
                    String name = scanner.nextLine();
                    studentDirectory.put(id, name);
                    System.out.println("Student added.");
                    break;
                case 2:
                    System.out.println("\nView All students:");
                    for (Map.Entry<String, String> entry : studentDirectory.entrySet()) {
                        System.out.println("ID: " + entry.getKey() + " | Name: " + entry.getValue());
                    }
                    break;

                case 3:
                    System.out.print("Enter a studentID# to search: ");
                    String searchId = scanner.nextLine();
                    if (studentDirectory.containsKey(searchId)) {
                        System.out.println("Student Name: " + studentDirectory.get(searchId));
                    } else {
                        System.out.println("Student not found.");
                    }
                    break;
                case 4:
                    System.out.print("Enter a studentID# to remove: ");
                    String removeId = scanner.nextLine();
                    if (studentDirectory.remove(removeId) != null) {
                        System.out.println("Student removed.");
                    } else {
                        System.out.println("Student ID not found.");
                    }
                    break;
                case 5:
                    System.out.println("Exiting program. Goodbye!");
                    scanner.close();
                    return;
                default:
                    System.out.println("Invalid option. Try again.");
            }
        }
    }
}
```

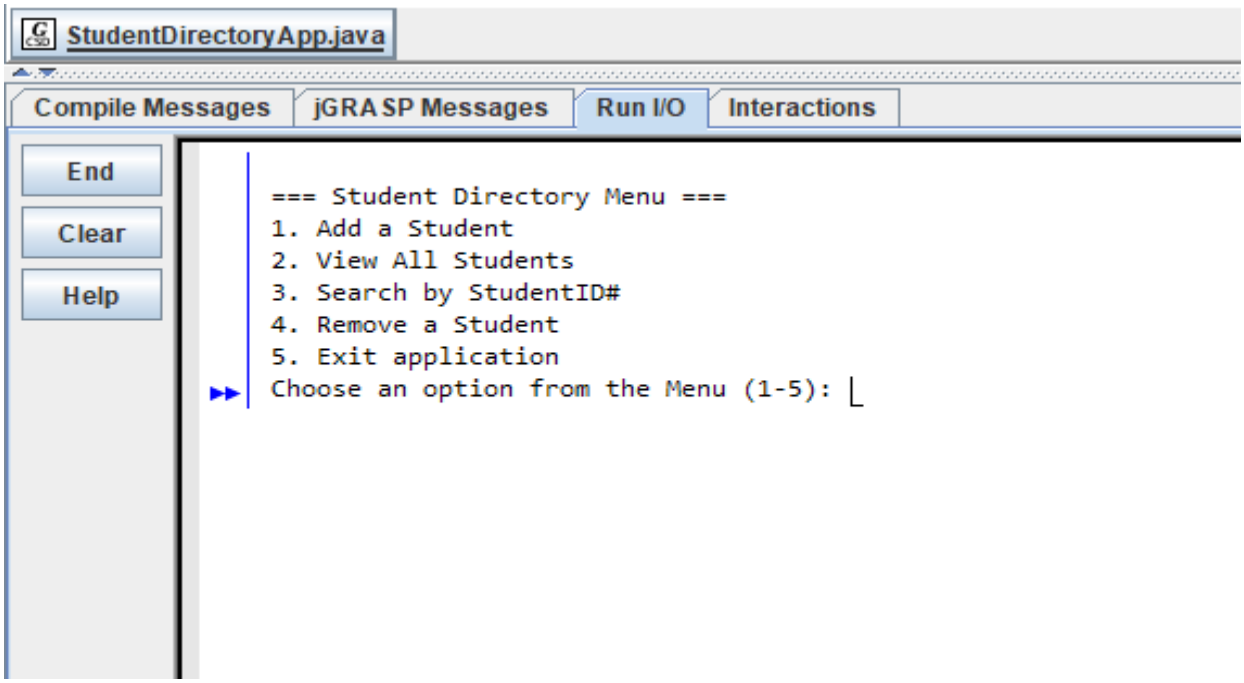
Step 3: After coding the program, go to **file/save** to save your java program as **Week17Lab2**



Step 4: After saving, compile (**click on compile icon or on your keyword hold Ctrl + B**) to check for syntax errors.



Step 5: If compiling is successfully then run (**click on the find and run main method icon or on your keyboard hold Ctrl + R**) your program.



Step 6: If successful your program should display an output like shown in the screenshot above.

Step 7: Week17Lab2 Completed! From the menu type a number from 1 to 5 to perform actions as per the menu information. This is the final lab activity for 4009 DSA.