MIS 768: Advanced Software Concepts
Spring 2024

Decision Structure

Purpose

- Familiarize with the if-else structure in Java
- Practice the usage of logical operator
- Familiarize with the switch case structure in Java

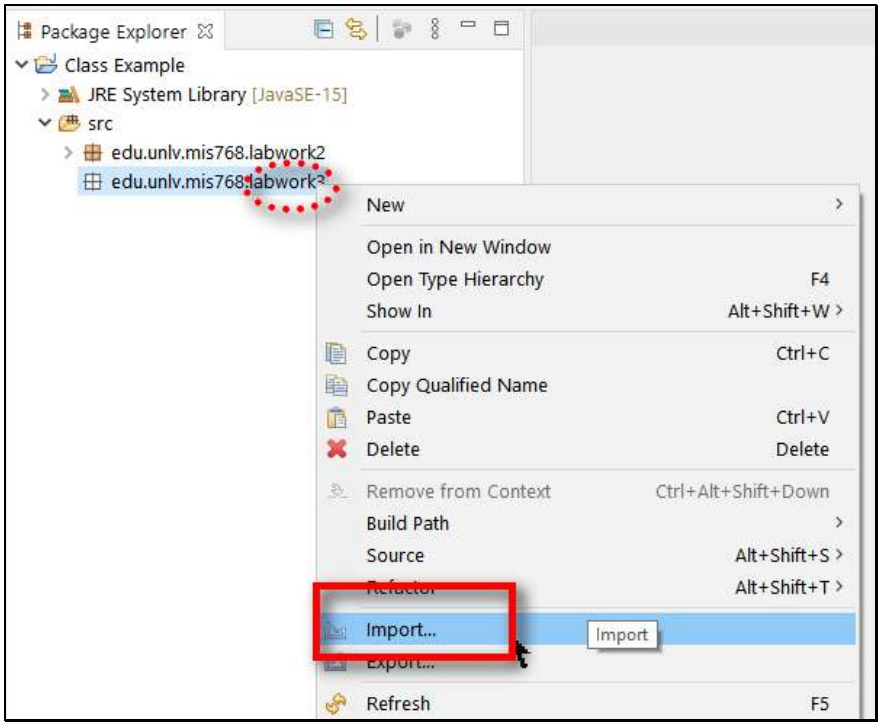
1. Preparation: Import java files

(1) Please create a new package **edu.unlv.mis768.labwork3**.

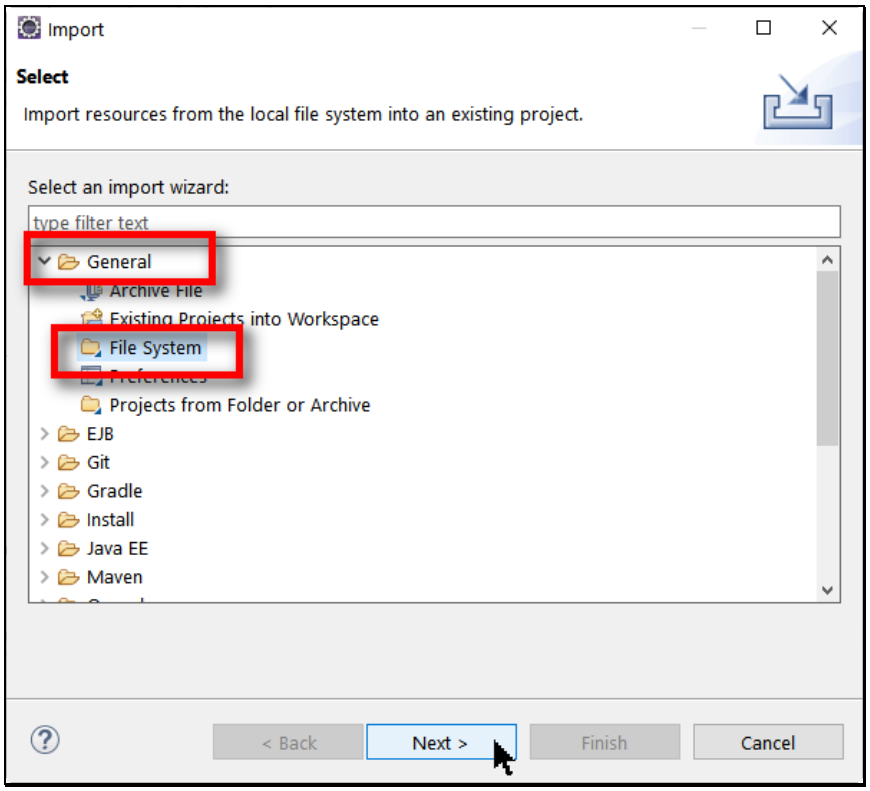
(2) Please download **03_lab files.zip**, and then extract the file. It contains six files.

(3) To import the file to the package, you can drag and drop the file to the package.

Or you can right-click on the package, then select **Import**



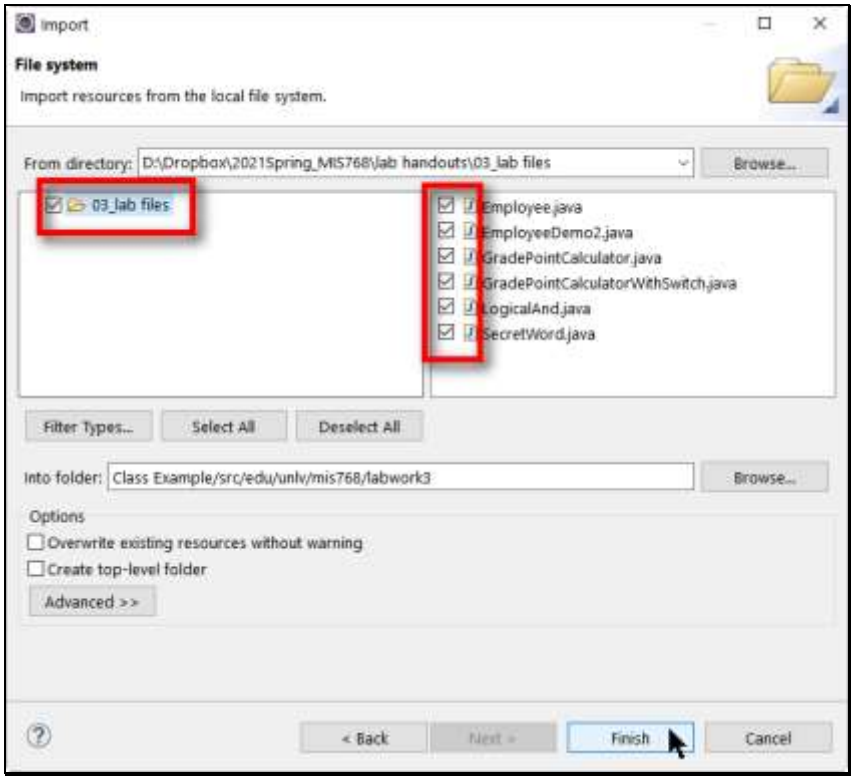
(4) Select **General \ File System**. Click **Next** button to continue.



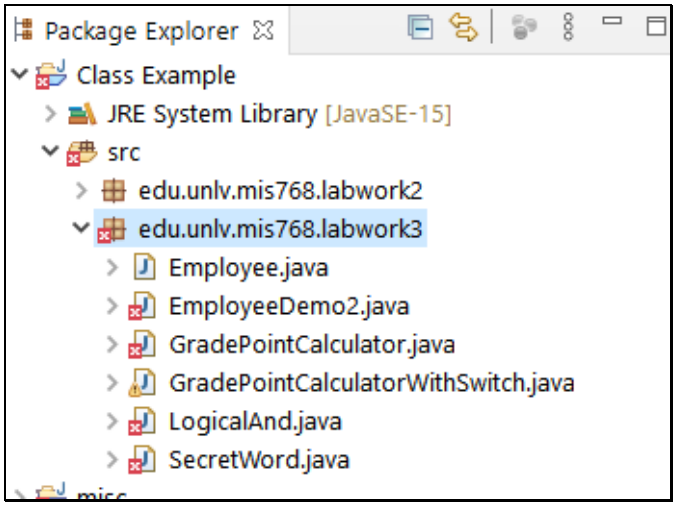
(5) Click **Browse..** button to select the folder that you saved the file you downloaded fro WebCampus.

Check all the four files to import.

Click **Finish** button.



(6) After importing, you will see errors at the **Package Explorer**. This is normal because the imported files are not complete program. You can double click to open the files.



2. if-else Statements

(7) Please open **EmployeeDemo2** class. It is an application class (i.e., one with the main method). In the **Employee** class example, an employee can earn a certain amount of experience points. We would like to limit the value to positive ones.

(8) We can implement this logic in the **Employee** class.

Please revise the **Employee** class as following:

```
30      // add a certain number of points to the experience point
31      public boolean earnExperiencePoint(int numOfPoints) {
32          // if the given points is negative
33          // return an error to the calling method
34          if(numOfPoints <0)
35              return false;
36          // if the given points is positive
37          // add the points
38          else {
39              experiencePoint+= numOfPoints;
40              return true;
41          }
42      }
43
```

(9) Then the **EmployeeDemo2** program should be written as following:

```
5  public class EmployeeDemo2 {
6
7      public static void main(String[] args) {
8          String name; // the name of the employee.
9          int points;  // the points earned.
10         Employee newbie = new Employee();  // the Employee object
11
12         // Create a Scanner object for keyboard input.
13         Scanner keyboard = new Scanner(System.in);
14
15         // Get the first number.
16         System.out.print("Enter the name: ");
17         name = keyboard.nextLine();
18         // Set the name for the employee
19           newbie.setName(name);
20
21         // Get the exp points.
22         System.out.print("Enter the points earned: ");
23         points = keyboard.nextInt();
24
25       if (newbie.earnExperiencePoint(points))      {
26           System.out.println("Points added");
27
28       }
29       else {
30          System.out.print("Points cannot be negative");
31       }
32           // print the name and the exp
33           System.out.println("Name: "+ newbie.getName());
34           System.out.println("Exp: "+ newbie.getExperiencePoint());
35     }
36
37 }
```

(10) You can now run and test the program.

3. Another Example of if-else Statements

(11) Please open **GradePointCalculator.java**.

In this program, the user enters either A, B, or C, and the program prints out the grade point accordingly.

(12) Please complete the program as shown below: (We assume the user enters only uppercase letters.)

```
7    public static void main(String[] args) {
8          char grade;       // A character entered by the user
9
10         // Create a Scanner object for keyboard input.
11         Scanner keyboard = new Scanner(System.in);
12
13         // Get one of the numbers 1, 2, or 3 from the user.
14         System.out.print("Enter A, B, or C: ");
15         // there is no nextChar() method
16         // we need to use next().charAt(0).
17         // next() returns the next word in the input as a string
18         // and charAt(0) function returns the first character in that string.
19         grade = keyboard.next().charAt(0);
20
21         // Determine the grade point entered.
22         if (grade == 'A') {
23             System.out.print("4.0");
24         } else if (grade == 'B') {
25             System.out.print("3.0");
26         } else if (grade == 'C') {
27             System.out.print("2.0");
28         } else {
29             System.out.print("0.0");
30         }
```

4. Logical Operators

(13) Open **LogicalAnd.java.**

In this program, we ask the user to input the number of hours an employee worked, and the points earned las week. If the number of hours is greater than the regular hour **AND** the current exp is greater than 200, than the employee is qualified for the bonus.

(14) We can implement the logic in **Employee** class, with the creation of a new method.

```
51     /* determine whether an employee can get bonus
52      * If the number of hours is greater than the regular hour AND the current exp
53      *  is greater than 200, than the employee is qualified for the bonus.
54      */
55     public boolean getBonusQualification(int numOfHours) {
56         if(numOfHours > REGULAR_HOURS && experiencePoint > 200)
57             return true;
58         else
59             return false;
60     }
```

(15) Please complete **LogicalAnd.java** by using the **getBonusQualification**() method:

```
12              Scanner keyboard = new Scanner(System.in);
13
14              // get the name
15              System.out.print("Enter the name: ");
16              name = keyboard.nextLine();
17              anEmployee.setName(name);
18
19              // get the hours
20              System.out.print("Enter the number of hours: ");
21              hours = keyboard.nextInt();
22
23              // get the points
24              System.out.print("Enter the number of points: ");
25              points = keyboard.nextInt();
26              // allow the employee to earn the point as designated
27              anEmployee.earnExperiencePoint(points);
28              // Determine whether the employee is qualified
29              if (anEmployee.getBonusQualification(hours)) {
30                  System.out.println("Qualify for bonus.");
31              }
32              else {
33                  System.out.println("Not qualify for bonus.");
34              }
35          }
```

5. String Comparison

(16) Open **SecretWord.java**

(17) In this example, when the user enters the secret word "professional," the program prints out a success message; otherwise, print out an error message.

The user input should be **case-insensitive**. (Note: using *String*.equalsIgnoreCase)

```
3  import java.util.Scanner;
4
5  public class SecretWord {
6          public static void main(String[] args) {
7                  String theWord = "PROFESSIONAL";
8                  String input;     // To hold the user's input
9
10                 // Create a Scanner object for keyboard input.
11                 Scanner keyboard = new Scanner(System.in);
12
13                 // Prompt the user to enter the secret word.
14                 System.out.print("Enter the secret word: ");
15                 input = keyboard.nextLine();
16
17                 if (                                    ){
18                    System.out.println("Congratulations! You know the " +
19                                       "secret word!");
20                 }
21                 else {
22                    System.out.println("Sorry, that is NOT the " +
23                                       "secret word!");
24                 }
25             }
26
27 }
```

6. switch statement

(18) Open **GradePointCalculatorWithSwitch.java**

In this example, the user enters either A, B, or C, and the program prints out the grade point accordingly.

(19) Please complete the program.

```
20              // Determine the grade point entered.
21              switch (grade) {
22                case 'A':
23                case 'a': // both A and a represents 4.0
24                    System.out.print("4.0");
25                    break;
26                case 'B':
27                case 'b':  // both B and b are 3.0
28                    System.out.print("3.0");
29                    break;
30                case 'C':
31                case 'c': // Both C and c are 2.0
32                    System.out.print("2.0");
33                    break;
34                default: // if not A, B, or C
35                    System.out.print("0.0");
36              }
```

7. Exercise

Please create a program that displays the price of a concert ticket based on users' input. The ticket price is based on the code entered, as shown below. If the user enters a number other than 1 to 4, the application should indicate the problem.

Class	Ticket Price
1	$15
2	$15
3	$25
4	$35
Other	Invalid