成绩	

重庆邮电大学

实验报告

2020-2021 学年第 2 学期

计算机科学导论

（第 1 次试验）

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课程名称：计算机科学导论

实验时间：2021 年 4 月 1 日

实验地点：综合实验大楼 A511/A512

1 实验名称

Selection Control Structures

2 实验目的

- Be able to construct boolean expressions to evaluate a given condition
- Be able to compare Strings
- Be able to use a flag
- Be able to construct if and if-else-if statements to perform a specific task
- Be able to construct a switch statement
- Be able to format numbers

3 实验内容

Task#1 The if Statement, Comparing Strings, and Flags

Construct a simple if statement to make a case-insensitive comparison between the user input and the first names of the owners, Mike and Diane. And set a discount flag for further use.

Task #2 The if-else-if Statement

Use an if-else-if statement to set appropriate cost according to the user input. And when the user input does not exist in any known size, set it to the cost to 12.99.

Task #3 Switch Statement

Write a switch statement to decide the crust type. Each case should be case-insensitive. And when the user input wasn't one of the choices, make a Hand-tossed crust.

Task #4 Using a Flag as a Condition

Use the flag as the condition of an if statement, in order to decide if a user is eligible to have a discount. If the user is eligible, show an information and make a $2.00 discount.

Task #5 Formatting Numbers

By using the DecimalFormat class to make the numbers just have 2 decimal places shown.

4 实验方法（原理、流程图）

The development environment is:

- OS: Ubuntu 20.04.2 LTS on Windows 10 (WSL1, Kernel build 19041)
- IDE/Editor: Visual Studio Code
- Java Runtime: OpenJDK 14.0.2 (build 14.0.2+12-Ubuntu-120.04)

For Task #1, it's just a simple "if" statement. Just compare the string variable `firstName` with the owners' names. It's true that we can convert them to lower case to get a case-insensitive comparison, but we can also use method `equalsIgnoreCase()`, so that the comparison is not case-sensitive. Use logical operator OR "`||`" to achieve our goal in one if statement.

For Task #2, it's also a "if" statement but with "else" and "else if" statements. Just a series of simple comparisons.

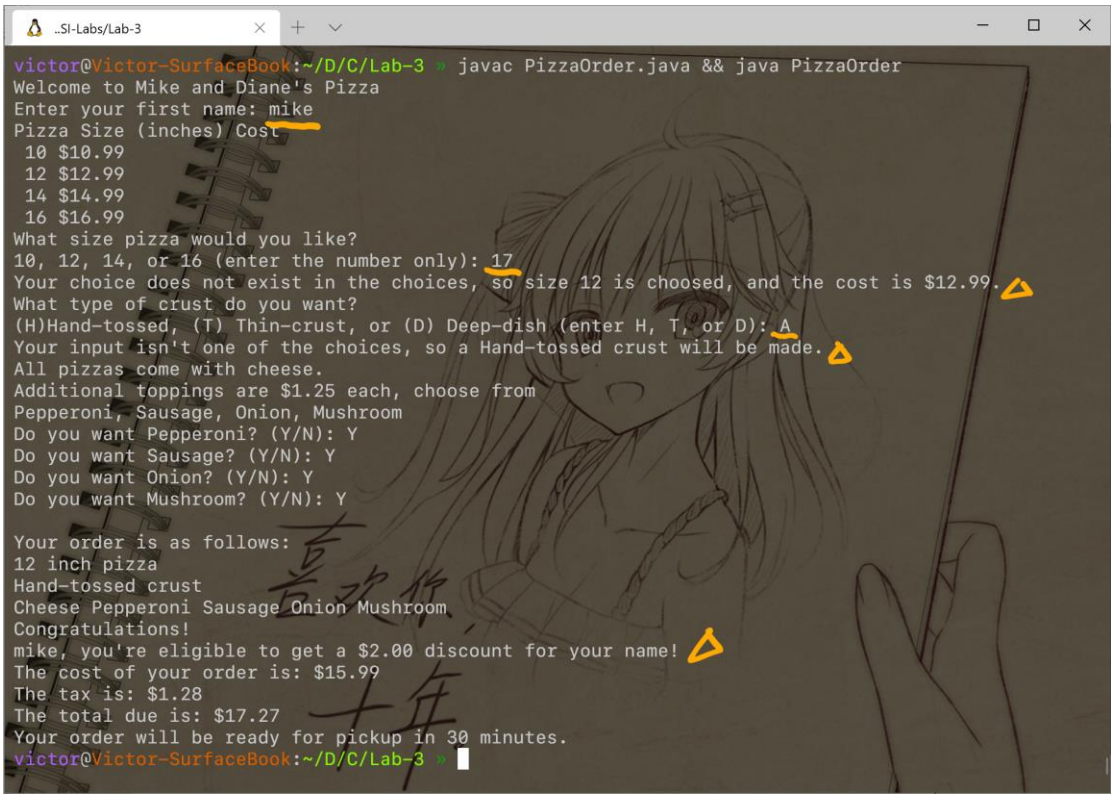
For Task #3, it's required to use a switch statement. Particularly, the default case contains two parts: printing an information and the same process as case H, so we put case H after default case, and remove the break statement of default. To make it case-insensitive, we should write two case statement for each case: one is in upper case, another one is in lower case.

For Task #4, it's a really simple task. Just use the Boolean variable `discount` as the condition in if statement, which is a flag.

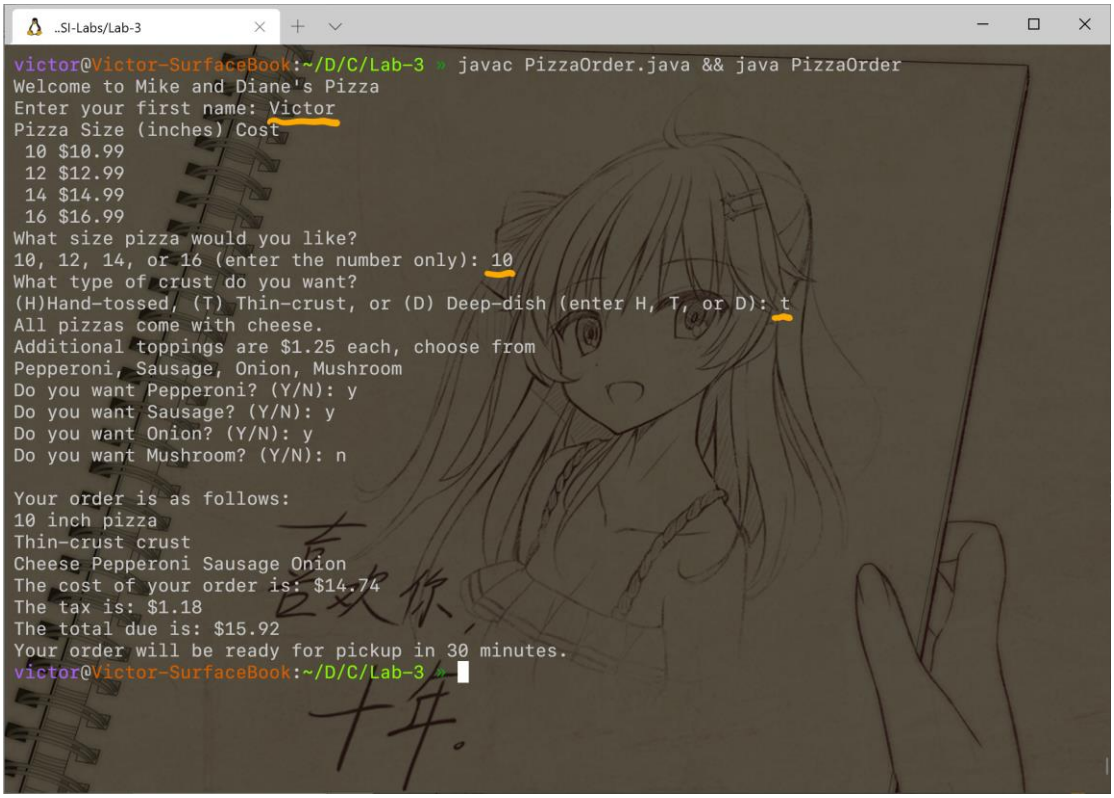
For Task #5, we should import the class `DecimalFormat` first. And use operator "new" to make an instance (object) of the class. And it's required to pass a format string to the constructor. To show 2 decimal places, the appropriate argument is "`###.##`", which indicates the formatter to print variable length of integer part and 2 decimal places.

5 实验结论

The lab has finished successfully. The program can completely achieve all goals. Here are some screenshots with several test cases.



The screenshot above tested an owner's first name, an invalid size and an invalid crust. And it works perfectly.



This screenshot tested a valid size, and a crust in lower case. It works perfectly too.

6 实验体会和收获

It’s my first lab experience on Java. It has a similar syntax like C++, which is really easy to get started. And as a Python and JavaScript/TypeScript programmer, the import statement is also easy to understand for me. And additionally, Java has a powerful standard library, which simplifies many problems. For example, if it’s in JavaScript and I want to compare two strings in case-insensitive way, I have to convert them to lower case and then compare. But in Java, it provides build-in method to do this work.

It’s a very easy lab though. In this lab, we practiced the selection control structures and formatting numbers in Java. And we are making a utility in Java, which shows the power of Java in solving problems.

The source code is shown below.

7　程序代码

```
/**
 This program allows the user to order a pizza. Author: CQUPT 2020215138.
*/
import java.util.Scanner;
import java.text.DecimalFormat;

public class PizzaOrder {
    public static void main(String[] args) {
        // TASK #5 Create a DecimalFormat object with 2 decimal places

        // get the format instance
        // '###.##' represents variable integer part and 2 decimal places
        DecimalFormat instance = new DecimalFormat("###.##");

        // Create a Scanner object to read input
        Scanner keyboard = new Scanner(System.in);

        String firstName; // user's first name
        boolean discount = false; // flag, true if user is eligible for discount
        int inches; // size of the pizza
        char crustType; // code for type of crust
        String crust = "Hand-tossed"; // name of crust
        double cost = 12.99; // cost of the pizza
        final double TAX_RATE = .08; // sales tax rate
        double tax; // amount of tax
        char choice; // user's choice
        String input; // user input
        String toppings = "Cheese "; // list of toppings
        int numberOfToppings = 0; // number of toppings

        // prompt user and get first name
        System.out.println("Welcome to Mike and Diane's Pizza");
        System.out.print("Enter your first name: ");
        firstName = keyboard.nextLine();

        // determine if user is eligible for discount by
        // having the same first name as one of the owners
        // ADD LINES HERE FOR TASK #1
        if (firstName.equalsIgnoreCase("Mike") || firstName.equalsIgnoreCase("Diane")) {
            discount = true;
        }

        // prompt user and get pizza size choice
        System.out.println("Pizza Size (inches) Cost");
        System.out.println(" 10 $10.99");
        System.out.println(" 12 $12.99");
        System.out.println(" 14 $14.99");
        System.out.println(" 16 $16.99");
        System.out.println("What size pizza would you like?");
        System.out.print("10, 12, 14, or 16 (enter the number only): ");
        inches = keyboard.nextInt();

        // set price and size of pizza ordered
        // ADD LINES HERE FOR TASK #2
        if (inches == 10)
            cost = 10.99;
        else if (inches == 12)
            cost = 12.99;
        else if (inches == 14)
            cost = 14.99;
        else if (inches == 16)
            cost = 16.99;
        else {
            // user input is invalid.
            System.out.println("Your choice does not exist in the choices, so size 12 is choosed, and t
he cost is $12.99.");
            inches = 12;
            cost = 12.99;
        }

        // consume the remaining newline character
        keyboard.nextLine();
```

```
        // prompt user and get crust choice
        System.out.println("What type of crust do you want? ");
        System.out.print("(H)Hand-tossed, (T) Thin-crust, or " + "(D) Deep-dish (enter H, T, or D): ");
        input = keyboard.nextLine();
        crustType = input.charAt(0);

        // set user's crust choice on pizza ordered
        // ADD LINES FOR TASK #3
        switch (crustType) {
            case 'T':
            case 't':
                crust = "Thin-crust";
                break;
            case 'D':
            case 'd':
                crust = "Deep-dish";
                break;
            default:
                System.out.println("Your input isn't one of the choices, so a Hand-tossed crust will be
made.");
                // without break here to reuse the code of case 'H'
            case 'H':
            case 'h':
                crust = "Hand-tossed";
                break;
        }

        // prompt user and get topping choices one at a time

        System.out.println("All pizzas come with cheese.");
        System.out.println("Additional toppings are $1.25 each," + " choose from");
        System.out.println("Pepperoni, Sausage, Onion, Mushroom");

        // if topping is desired,
        // add to topping list and number of toppings
        System.out.print("Do you want Pepperoni? (Y/N): ");
        input = keyboard.nextLine();
        choice = input.charAt(0);
        if (choice == 'Y' || choice == 'y') {
            numberOfToppings += 1;
            toppings = toppings + "Pepperoni ";
        }
        System.out.print("Do you want Sausage? (Y/N): ");
        input = keyboard.nextLine();
        choice = input.charAt(0);
        if (choice == 'Y' || choice == 'y') {
            numberOfToppings += 1;
            toppings = toppings + "Sausage ";
        }
        System.out.print("Do you want Onion? (Y/N): ");
        input = keyboard.nextLine();
        choice = input.charAt(0);
        if (choice == 'Y' || choice == 'y') {
            numberOfToppings += 1;
            toppings = toppings + "Onion ";
        }
        System.out.print("Do you want Mushroom? (Y/N): ");
        input = keyboard.nextLine();
        choice = input.charAt(0);
        if (choice == 'Y' || choice == 'y') {
            numberOfToppings += 1;
            toppings = toppings + "Mushroom ";
        }
        // add additional toppings cost to cost of pizza
        cost = cost + (1.25 * numberOfToppings);

        // display order confirmation
        System.out.println();
        System.out.println("Your order is as follows: ");
        System.out.println(inches + " inch pizza");
        System.out.println(crust + " crust");
        System.out.println(toppings);

        // apply discount if user is elibible
        // ADD LINES FOR TASK #4 HERE
        if (discount) {
            System.out.println("Congratulations!");
```

```
            System.out.printf("%s, you're eligible to get a $2.00 discount for your name!\n", firstName
);
            cost -= 2;
        }

        // EDIT PROGRAM FOR TASK #5
        // SO ALL MONEY OUTPUT APPEARS WITH 2 DECIMAL PLACES

        System.out.println("The cost of your order is: $" + instance.format(cost));
        // calculate and display tax and total cost
        tax = cost * TAX_RATE;
        System.out.println("The tax is: $" + instance.format(tax));
        System.out.println("The total due is: $" + instance.format(tax + cost));

        System.out.println("Your order will be ready for pickup in 30 minutes.");
    }
}
```