FACULTY: INORMATION & COMMUNICATION TECHNOLOGY **SUBJECTS**: PRINCIPLES OF PROGRAMMING A & INTRODUCTION TO PROGRAMMING I PPA115D & TRO115D	**WEB/SEMESTER TEST 2**

Tshwane University of Technology

We empower people

WEB/SEMESTER TEST 2 Duration: 12 hrs Date: Total: 97 Pages: 29	**1st Examiner** V MEMANI

"Code and test one functionality at a time"
- **Vathiswa Booi**

Instructions

- All the questions must be done on **EC** (**1**, **2**, **3, 4**, **5** and **6**).
- To provide answers on **EC**, please logon **EC** and go to **Student → Tests → Web Test 4**.
- Enter the **subject code** as **PPA115D** or **TRO115D, intake** is **20201** and **test number J.**
- Provide your answers under the following sections:
  - ✓ Question **1** under section **1**.
  - ✓ Question **2** under section **2**.
  - ✓ Question **3** under section **3**.
  - ✓ Question **4** under section **4**.
  - ✓ Question **5** under section **5**.
  - ✓ Question **6** under section **6**.

Question 1: Theory **//10//**

Questions

*For each of the following statements (**1.1 – 1.4**), state whether the given statement is **True** or **False**.*

1.1 It's good practice to write Java code without having analyzed and designed a solution to a problem first. [1]

1.2 The name of a variable can start with a capital letter. [1]

1.3 A floating data type can be explicitly cast into an integer. [1]

1.4 The statement: ***if(age > 15)***, is the same as ***if(age >= 15)***. [1]

*For each of the following statements (**1.5 – 1.7**), choose a letter (**A, B, C** or **D**) that corresponds to the correct answer.*

1.5 If I have a condition to test with two different instruction sets to execute depending on the evaluation outcome, which selection control will be most appropriate to use? [2]

A. If statement.
B. Compound if statement.
C. If else statement.
D. If elseif else statement.

1.6 What is the end product of the compilation phase? [2]

A. Source code.
B. Byte code.
C. Executable code.
D. None of the above.

1.7 What is the purpose of code commenting? [2]

A. Make my code look neat.

B. Make my code readable.

C. Make my code executable.

D. Make my code compilable.

Question 2: Code reading **//10//**

Problem statement

2.1 Pharmacy shop XYZ practices safety measures against CORONA virus infection. The pharmacy requires customers to wear face marks and have their temperatures taken. Customers with temperature values less than 38 degrees Celsius are granted access. Which code snippet best represents the condition. Choose either **A**, **B**, **C** or **D**. [2]

```
A. if((wearingMask == true) & (temperature < 38)){
       System.out.println("Come in");
   }

B. if((wearingMask == true) && (temperature < 38)){
       System.out.println("Come in");
   }

C. if((wearingMask == true) | (temperature < 38)){
       System.out.println("Come in");
   }

D. if((wearingMask == true) || (temperature < 38)){
       System.out.println("Come in");
   }
```

Your choice: _____

2.2 Mulenga wants to write code that reverses the order of **2-digit** numbers. For example, if he has the number **23**, the code must reverse the digits to **32**.

Which code snippet best meets the requirements of Mulenga? Choose either **A, B, C** or **D**.

A.
```
int unit, tenth, oldNumber = 23, newNumber;
tenth = oldNumber / 10;
unit  = oldNumber % 10;
newNumber = unit * 10 + tenth;
```

B.
```
int unit, tenth, oldNumber = 23, newNumber;
tenth = oldNumber / 10;
unit  = oldNumber % 10;
newNumber = unit * 10 + 10;
```

C.
```
int unit, tenth, oldNumber = 23, newNumber;
tenth = oldNumber / 10;
unit  = oldNumber % 10;
newNumber = 1 * 10 + tenth;
```

D.
```
int unit, tenth, oldNumber = 23, newNumber;
tenth = oldNumber / 10;
unit  = oldNumber % 10;
newNumber = unit + tenth;
```

Your choice: _____

2.3 Institution **XYZ** wants to increase the salary of all **Computer Science** lecturers involved in programming 1 by **10%.** The code of the department is **C** or **c** and the code for the programming subject is **1**. Looking at the given code snippet below, which code is missing at **A** and **B?** [2]

```
char deptCode;
int subjectCode;
Scanner sc = new Scanner(System.in);
double salary;

System.out.print("Please enter your department code: ");
deptCode = sc.next().charAt(0);
System.out.print("Please enter your subject code: ");
subjectCode = sc.nextInt();

if(____A____) {
    System.out.println("You deserve a raise");
    System.out.print("Please enter your current salary: R");
    salary = sc.nextDouble();
    salary = _________B_________;
} else {
    System.out.println("Sorry, no raise for you.");
}
```

Choose either **A, B, C** or **D**.

```
A. The missing code is:
   at A: (deptCode == 'C' || deptCode == 'c') && (subjectCode == 1)
   at B: salary + 0.1 * salary
B. The missing code is:
   at A: (deptCode == 'C' || deptCode == 'c') & (subjectCode == 1)
   at B: salary + 0.1 * salary
C. The missing code is:
   at A: (deptCode == 'C' || deptCode == 'c') && (subjectCode == 1)
   at B: salary + 10% * salary
D. The missing code is:
   at A: (deptCode == 'C' || deptCode == 'c') && (subjectCode == 1)
   at B: salary + 10 * salary
```

Your choice: _____

2.4 Lerato wants to display the message **"Hello"** on the screen if the value of **i** is less than **10**. Which of the following statements best describes the intentions of Lerato? Choose either **A**, **B**, **C** or **D**. [2]

```
A. if(i < 10){
     System.out.println("Hello");
   }

B. if(i > 10){
     System.out.println("Hello");
   }

C. if(i <= 10){
     System.out.println("Hello");
   }

D. if(i >= 10){
     System.out.println("Hello");
   }
```

Your choice: _____

2.5 The code below shows a menu. A user selects either **1** or **2,** and based on the selection, the code displays an appropriate message. Looking at the given code snippet below, which code is missing at **A, B, C** and **D**? [2]

```
int code;
Scanner sc = new Scanner(System.in);
System.out.println("Please select an item code: " + "\n" +
                   "1 - tooth paste" + "\n" +
                   "2 - bath soap"   + "\n" );
code = sc.nextInt();

switch(_________A_______){
    case _______B_______:
        System.out.println("You've selected a tooth paste.");
        break;
    case _______C_______:
        System.out.println("You've selected a bath soap.");
        break;
    _____________D_______:
        System.out.println("Invalid code selected.");
}
```

Choose either **A, B, C or D**.

```
A. The missing code is:
   at A: code
   at B: 1
   at C: 2
   at D: default
B. The missing code is:
   at A: code
   at B: 1
   at C: 2
   at D: else
C. The missing code is:
   at A: code
   at B: '1'
   at C: '2'
   at D: default
D. The missing code is:
   at A: code
   at B: "1"
   at C: "2"
   at D: else
```

Your choice: _____

Question 3: IPO chart creation **//10//**

Problem statement

The distance between two points, A(x_1,y_1) and B(x_2,y_2) is given by the following formula:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

In this section, we want you to create an IPO chart that will determine and display the distance between two points. Given to you in the next page is an incomplete IPO chart that must be filled with answers from the table provided below.

To do

Create an IPO chart that will determine and display the distance between two points. Given to you below is table 1. The table has possible answers that you can use to complete the given IPO chart. Each possible answer is represented by a letter on its left, e.g **distance** is represented by **M**. Use the letters corresponding to answers to fill-in the incomplete IPO chart.

A	Ask user to enter x_1	**D**	Ask user to enter y_2	**G**	Enter x_1	**J**	Enter y_2	**M**	distance
B	Ask user to enter y_1	**E**	Display distance	**H**	Enter x_2	**K**	y_2	**N**	x_1
C	Ask user to enter x_2	**F**	y_1	**I**	Enter y_1	**L**	Determine distance	**O**	x_2

Table 1: Possible answers for completing IPO chart.

Incomplete IPO chart

I	P	O
1. x_1 2. _____ 3. x_2 4. _____	5. Ask user to enter x_1 6. _____ 7. _____ 8. _____ 9. _____ 10. _____ 11. _____ 12. Enter y_2 13. _____ 14. _____	15. distance

Question 4: Flowchart implementation **//10//**

Problem statement

COVID-19 has drastically changed the way people lead their lives. Suddenly people are expected to wear face masks in public, sanitise their hands and practice social distancing. Entry to public institutions such as schools also require people's temperatures to be checked. Temperatures above 38 degrees Celsius result in a person being refused entry and advised to seek medical help.

In this section we want you to create a COVID-19 application for institution XYZ. The application must allow institution XYZ to practice safety measures to prevent the infection spread of CORONA virus. Through this application, people who are either having temperatures greater than 38 degrees Celsius, not wearing face masks or not having their hands sanitised, must be refused entry into the premises of XYZ.

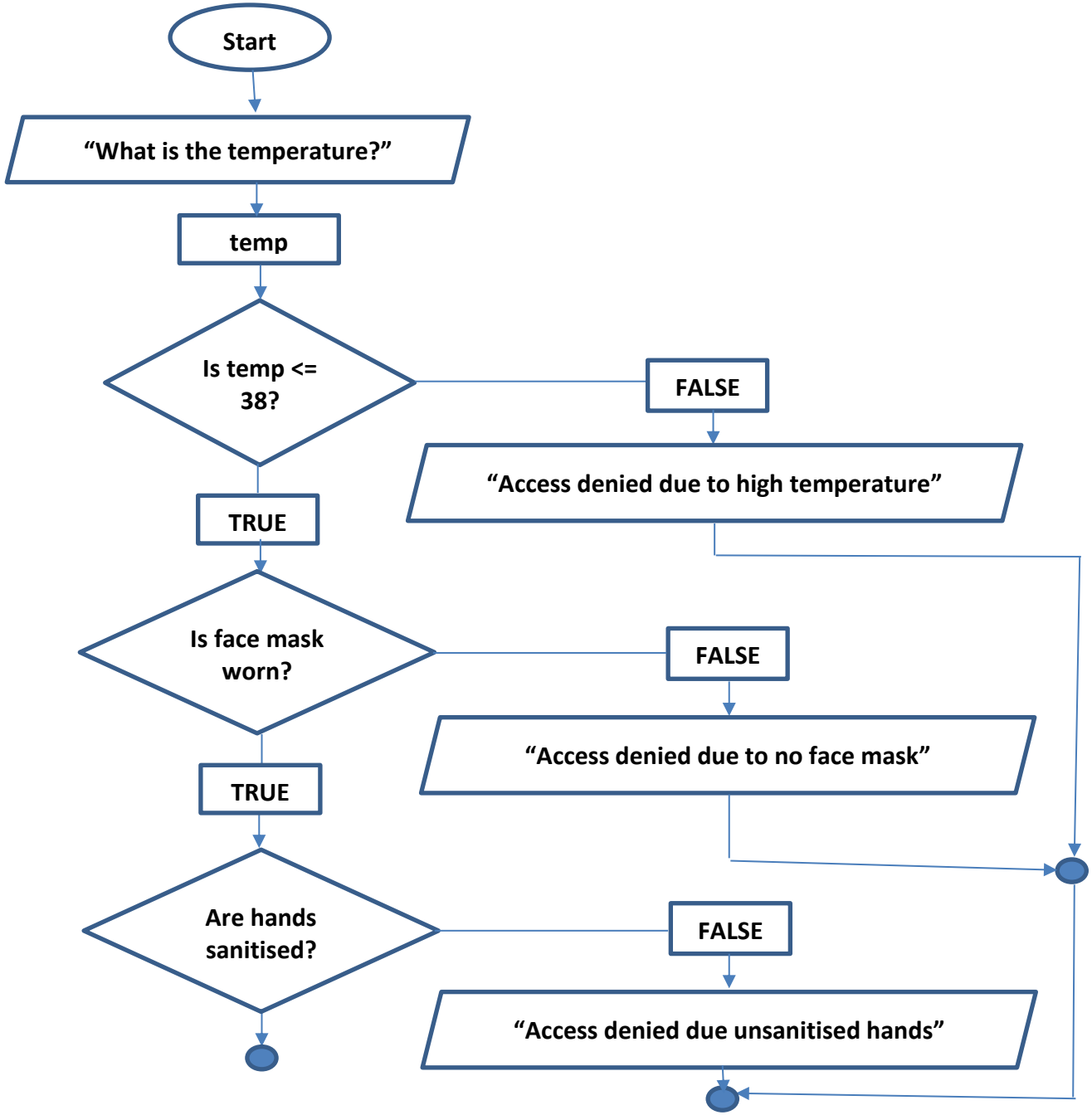
Given

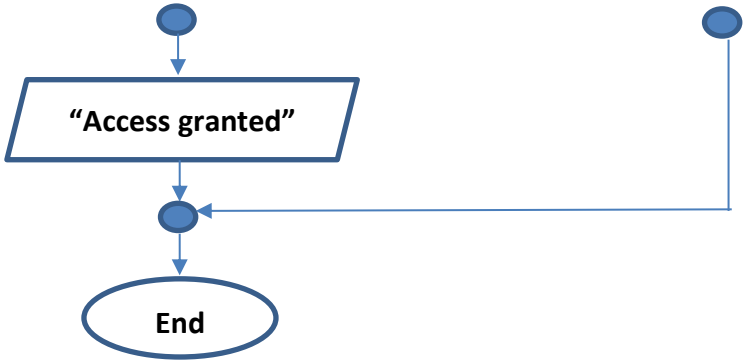
You are a given a flowchart in the next two pages that shows the flow of the solution program. You are expected to convert the flowchart into a working Java program.

To do

Convert the given flowchart into a working Java program called **Covid19App.java**.

Flowchart


Start
"What is the temperature?"
temp
Is temp <= 38?
FALSE
"Access denied due to high temperature"
TRUE
Is face mask worn?
FALSE
"Access denied due to no face mask"
TRUE
Are hands sanitised?
FALSE
"Access denied due unsanitised hands"


"Access granted"
End

Question 5: Problem solving **//20//**

Problem statement

Palindrome numbers are numbers that are the same even when put in reverse order. For example, **1111** is a palindrome number because even if you reverse the number, you will still get the same number, **1111**. But **1234** is not a palindrome number, because the reverse gives us **4321**, a number totally different from the original **1234**.

In this section we want you to create an application that will determine whether a four-digit number is a palindrome or not. The application must get a number from a user, verify that it is **4-digit** long, and thereafter determine whether the number is a palindrome or not. If the number is not 4-digit, the application must display an error message and come to an end. Again if the number is 4-digit but not palindrome, an error message must be displayed and the program come an end. If the number is a palindrome, a message confirming that must be displayed before allowing the program to come to an end.

To do

Create a Java program called **PalindromeApp** that will determine whether a **4-digit** number is a palindrome number or not.

Question 6: Project coding **//27//**

Problem statement

Lumumba is an entrepreneur based in eMalahleni. He has opened a sphaza shop called **EveryThingFishy.** The shop specializes in selling fast food related to fish.

Table 1 below shows the menu they currently sell.

No.	Menu	Amount (R)
1	Large Hake Fish	100
2	Fish Burger	85

Table 1: EveryThingFishy menu

Their large hake fish is served with either **salads** or **chips**. The fish burger is served as either **spicy** or **regular**. As a starting company, they charge a small fee for the extras. Table 2 shows the amount charged for the extras. There's no extra charge for the regular option.

No.	Menu	Amount (R)
1	Salads	10
2	Chips	5
3	Spice	2

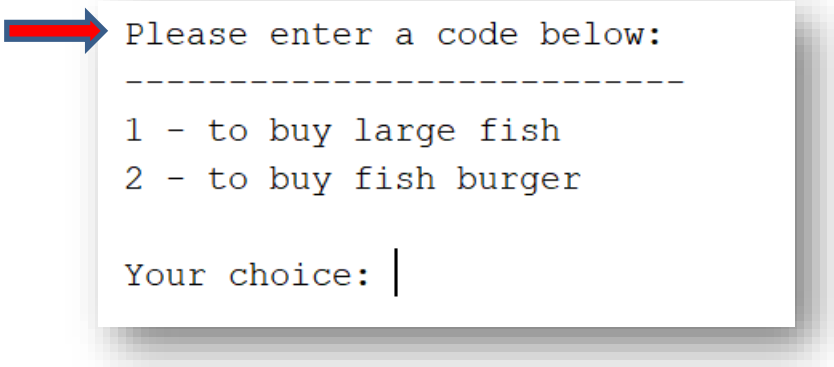
Table 2: Extras

Create an application for Lumumba that will help him sell to the customers. The application must allow a customer to choose a menu item to buy. If an invalid option is made, the application must display an error message and thereafter come to an end. If the user enters a valid menu code, the customer must be allowed to select the extras relating to that menu. The amount due must be determined and displayed. The application must give the customer an opportunity of making payment. If payment is insufficient, the application must display an error message and thereafter come to an end. If payment is valid, change must be determined and displayed. Lastly, the application must display the details of the food bought. In the next pages we provide a graphical demonstration on how the program should work.

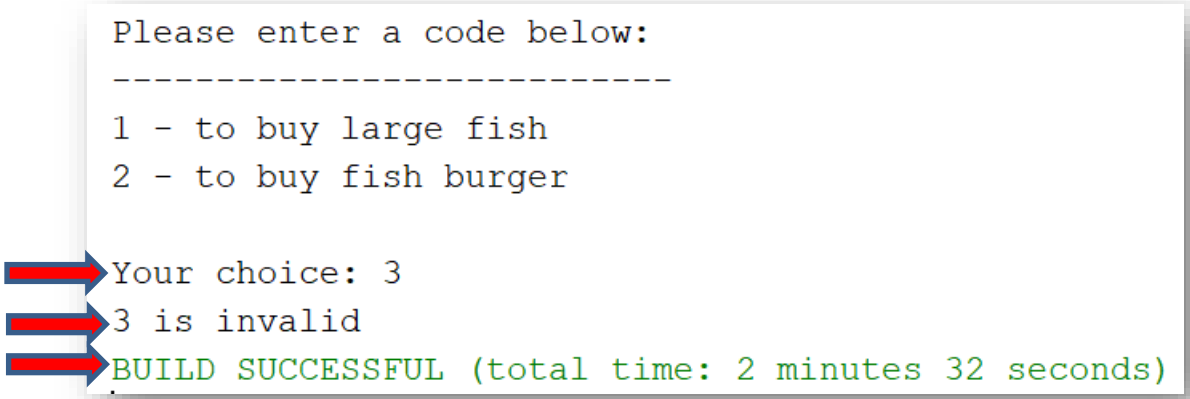
How should the program work?

The application should work as follows:

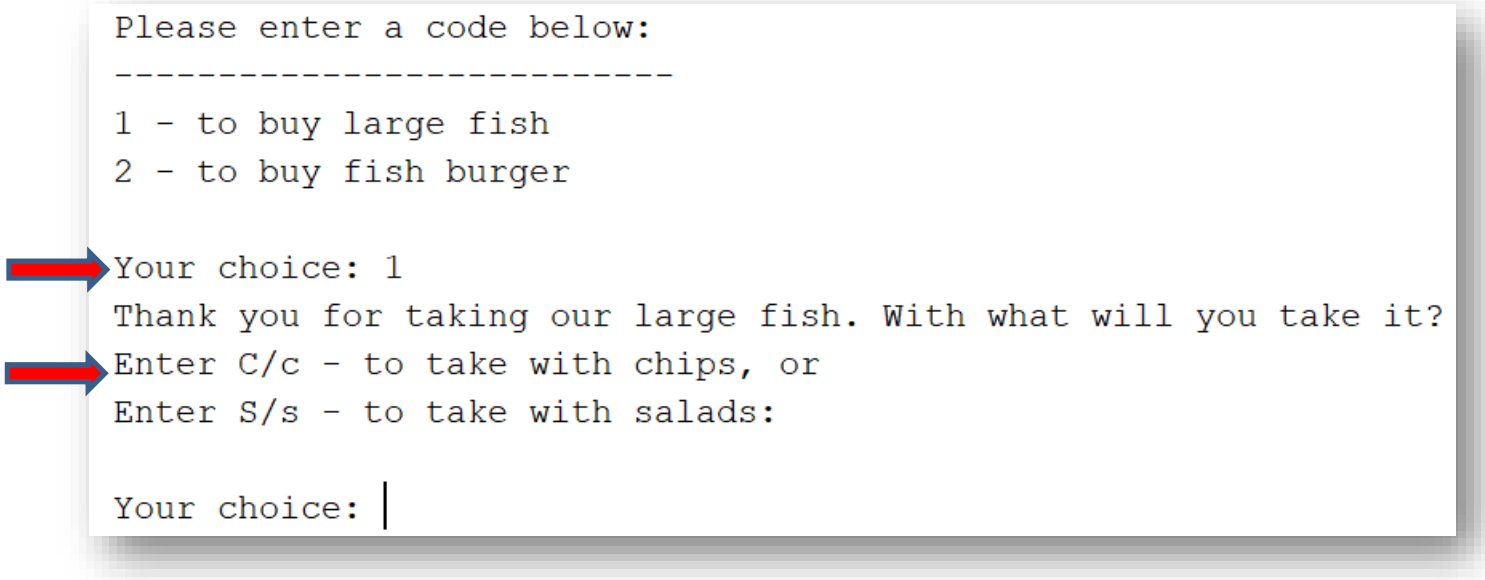
- Display the menu options.



- If the user enters an invalid code such as **3**, display an error message and end the program.



- If the user enters a valid code such as **1** to choose large fish, display the extras relating to menu **1**.



- If the user enters an **S**, display the amount due and ask user to make payment.

```
Please enter a code below:
--------------------------
1 - to buy large fish
2 - to buy fish burger

Your choice: 1
Thank you for taking our large fish. With what will you take it?
Enter C/c - to take with chips, or
Enter S/s - to take with salads:

Your choice: S

The amount due is R110.0
Please make payment: R
```

- If payment is insufficient, display an error message and end the program.

```
Please enter a code below:
---------------------------
1 - to buy large fish
2 - to buy fish burger

Your choice: 1
Thank you for taking our large fish. With what will you take it?
Enter C/c - to take with chips, or
Enter S/s - to take with salads:

Your choice: S

The amount due is R110.0
Please make payment: R100
R100.0 is invalid payment.
BUILD SUCCESSFUL (total time: 10 seconds)
```

- If payment is valid, display change and the description of the food bought.

```
Please enter a code below:
--------------------------
1 - to buy large fish
2 - to buy fish burger

Your choice: 1
Thank you for taking our large fish. With what will you take it?
Enter C/c - to take with chips, or
Enter S/s - to take with salads:

Your choice: S

The amount due is R110.0
Please make payment: R115

Change is R5.00
Items bought: Large first with salad.
BUILD SUCCESSFUL (total time: 21 seconds)
```

- If the user chooses a fish burger by entering a 2, check if user wants a regular or spicy burger.

```
Please enter a code below:
--------------------------
1 - to buy large fish
2 - to buy fish burger

Your choice: 2
Thank you for taking our fish burger. How do you want the burger?
Enter S/s - to have it spicy
Enter R/r - to have it regular

Your choice:
```

- If the user wants the burger spicy, display the amount due and prompt for payment.

```
Please enter a code below:
--------------------------
1 - to buy large fish
2 - to buy fish burger

Your choice: 2
Thank you for taking our fish burger. How do you want the burger?
Enter S/s - to have it spicy
Enter R/r - to have it regular

Your choice: s

The amount due is R87.0
Please make payment: R
```

- If valid payment is made, display change and the description of the food bought. End the program thereafter.

```
Please enter a code below:
--------------------------
1 - to buy large fish
2 - to buy fish burger

Your choice: 2
Thank you for taking our fish burger. How do you want the burger?
Enter S/s - to have it spicy
Enter R/r - to have it regular

Your choice: s

The amount due is R87.0
Please make payment: R90

Change is R3.00
Items bought: Spicy fish burger.
BUILD SUCCESSFUL (total time: 4 minutes 16 seconds)
```

To do

Create an application called **LumumbaEveryThingFishyApp.** The application must solve the problem as stated in the **"Problem Statement"** section and demonstrated in **"How should the program work?"**