# Task 1: Understand the problem:

* public boolean isBagCorrectWeight()

Firstly, check if the bag is a regular bag or a large bag.

If it’s a regular bag, calculate the difference (absolute value) between the input weight and standard regular weight. If the difference is within the tolerance (EPSILON), the method returns true; otherwise, the method returns false.

If it’s a large bag, calculate the difference (absolute value) between the input weight and standard large weight. If the difference is within the tolerance (EPSILON), the method returns true; otherwise, the method returns false.

* public static void main(String[] args)

Firstly, output the menu. If the user’s input is invalid, output “Invalid bag size entered” and ask user to choose to continue the program or not (output “Continue Program? (yes/no)”).

Secondly, if the input is valid for the menu. Then ask user to enter weight. If the input weight is within the tolerance, consider this bag as a good bag and the number of good bags +1; otherwise, consider this bag as a bad bag and the number of bad bags +1.

After the second step, ask user to choose to continue the program or not (output “Continue Program? (yes/no)”). If the user enters “yes” (not case sensitive), the program returns to step 1 and starts over. If the user enters “no” (not case sensitive), the program ends. If the user enters any other invalid input, output “Invalid input. Please enter "yes" or "no"”, so the program will ask the user to choose again.

# Task 2: Develop and Describe an Algorithm

## UML diagrams

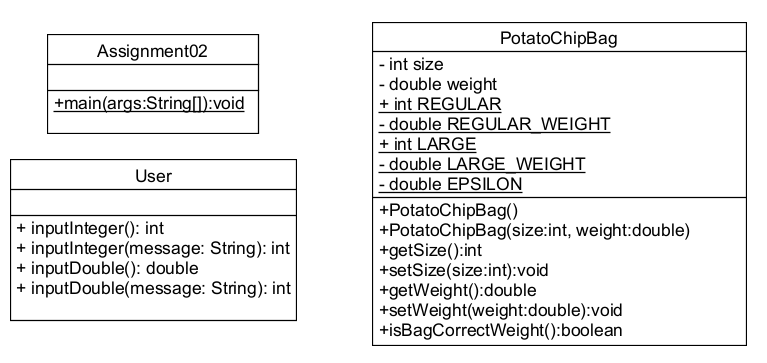


Figure 1. UML diagrams of classes

## Pseudocode of isBagCorrectWeight()

/\*

\* This method is used to check if the difference is within the tolerance

\* (EPSILON). If the difference is within the tolerance, return true; otherwise, false.

\*/

public boolean isBagCorrectWeight()

/\* Set default result to be true \*/

boolean result = true;

/\* When the size is REGULAR \*/

if size is REGULAR

num difference = Math.abs(weight - REGULAR\_WEIGHT)

/\*

\* If the difference is within the tolerance, the bag is a good bag.

\* Return the result without alteration.

\*/

if difference <= EPSILON

return result

/\*

\* If the difference is not within the tolerance, the bag is a bad bag.

\* set result to be false, then return it

\*/

else

result = false

return result

/\* When the size is LARGE\_WEIGHT \*/

else

num difference = Math.abs(weight - LARGE\_WEIGHT)

/\*

\* If the difference is within the tolerance, the bag is a good bag.

\* Return the result without alteration.

\*/

if difference <= EPSILON

return result

/\*

\* If the difference is not within the tolerance, the bag is a bad bag.

\* set result to be false, then return it

\*/

else

result = false

return result

## Pseudocode of main() method

Start

/\* Declarations and initiations \*/

num size // size of the bag

num weight // weight of the bag

num goodBags = 0 // number of good bags

num badBags = 0 // number of bad bags

String choice = "yes" // choice of continuing the program or not

Scanner keyboard

while (choice is "yes")

PotatoChipBag bag

User user

/\*Output menu and let user enter size number\*/

size = user.inputInteger(“message”)

/\* If the user input 1 or 2, the program continues with next steps normally \*/

if (size is 1 or 2)

/\*Output menu and let user enter weight\*/

weight = user.inputDouble(“message”)

bag.setSize(size)

bag.setWeight(weight)

/\*

\* Verify the bag is good or bad. If the difference is within the

tolerance, the

\* bag is a good bag. Return true and the number of good bags will +1.

\* If the difference is not within the tolerance, the bag is a bad bag.

Return false

\* and the number of bad bags will +1.

\*/

if (bag.isBagCorrectWeight() is true)

goodBags++

else

badBags++

System.out.println("Good bags:" + goodBags)

System.out.println("Bad bags:" + badBags)

System.out.println("Total bags:" + (goodBags + badBags))

System.out.println("Program by Yanzhang Wu")

/\*

\* If the user input is not 1 or 2, the program will let the user to choose

\* continue or not

\*/

else

System.out.println("Program by Yanzhang Wu")

System.out.println("Continue Program? (yes/no)")

choice = keyboard.nextLine()

/\*

\* Use this loop to ask user to enter the right option "yes" or "no" (not case

\* sensitive)

\*/

while (choice is not "yes" or "no")

System.out.println(“message”)

choice = keyboard.nextLine()

/\*

\* Use this loop to terminate the program if the user enter "no" (not case

\* sensitive)

\*/

while (choice is "no")

System.out.println("Program has shut down");

break;

End

## Flowchart of isBagCorrectWeight()

Diagram

Description automatically generated

Figure . Flowchart of isBagCorrectWeight()

## Flowchart of main() method

Diagram

Description automatically generated

Figure 3. Flowchart of main()

# Task 3: Test Algorithm with Simple Inputs

## Table 1: Test Plan for method main for the repetition structure logic (looping tests)

|  |  |  |  |
| --- | --- | --- | --- |
| Input | Expected Output | Actual Output | Description |
| 1  9.25  yes | Enter bag size:  1 for regular size  2 for large size  1  Enter weight: 9.25  Good bags:1  Bad bags:0  Total bags:1  Program by Yanzhang Wu  Continue Program? (yes/no)  yes  Enter bag size:  1 for regular size  2 for large size | Enter bag size:  1 for regular size  2 for large size  1  Enter weight: 9.25  Good bags:1  Bad bags:0  Total bags:1  Program by Yanzhang Wu  Continue Program? (yes/no)  yes  Enter bag size:  1 for regular size  2 for large size | Test passes, program continues |
| hello  hello  YES  2  13 | Enter bag size:  1 for regular size  2 for large size  hello  Invalid bag size entered.  Program by Yanzhang Wu  Continue Program? (yes/no)  hello  Invalid input. Please enter "yes" or "no"  YEs  Enter bag size:  1 for regular size  2 for large size  2  Enter weight: 13  Good bags:0  Bad bags:1  Total bags:1  Program by Yanzhang Wu  Continue Program? (yes/no) | Enter bag size:  1 for regular size  2 for large size  hello  Invalid bag size entered.  Program by Yanzhang Wu  Continue Program? (yes/no)  hello  Invalid input. Please enter "yes" or "no"  YEs  Enter bag size:  1 for regular size  2 for large size  2  Enter weight: 13  Good bags:0  Bad bags:1  Total bags:1  Program by Yanzhang Wu  Continue Program? (yes/no) | Test passes.  Program asks user to input again when there is an invalid input.  Program is not case sensitive for “yes” |
| 0  0  No | Enter bag size:  1 for regular size  2 for large size  0  Invalid bag size entered.  Program by Yanzhang Wu  Continue Program? (yes/no)  0  Invalid input. Please enter "yes" or "no"  No  Program has shut down | Enter bag size:  1 for regular size  2 for large size  0  Invalid bag size entered.  Program by Yanzhang Wu  Continue Program? (yes/no)  0  Invalid input. Please enter "yes" or "no"  No  Program has shut down | Test passes.  Program asks user to input again when there is an invalid input.  Program is not case sensitive for “no” |

## Table 2: Test Plan for method main for good chip bag, bad chip bag, total bags

|  |  |  |  |
| --- | --- | --- | --- |
| Input | Expected Output | Actual Output | Description |
| 1  9.25  no | Good Bag: 1  Bad Bag: 0  Total Bags: 1 | Good Bag: 1  Bad Bag: 0  Total Bags: 1 | Matches, one good bag, correct report, program exits |
| 1  10  no | Enter bag size:  1 for regular size  2 for large size  1  Enter weight: 10  Good bags:0  Bad bags:1  Total bags:1  Program by Yanzhang Wu  Continue Program? (yes/no)  no  Program has shut down | Enter bag size:  1 for regular size  2 for large size  1  Enter weight: 10  Good bags:0  Bad bags:1  Total bags:1  Program by Yanzhang Wu  Continue Program? (yes/no)  no  Program has shut down | Matches, one bad bag, correct report, program exits |
| 1  9.25  yes  2  15  no | Enter bag size:  1 for regular size  2 for large size  1  Enter weight: 9.25  Good bags:1  Bad bags:0  Total bags:1  Program by Yanzhang Wu  Continue Program? (yes/no)  yes  Enter bag size:  1 for regular size  2 for large size  2  Enter weight: 15  Good bags:1  Bad bags:1  Total bags:2  Program by Yanzhang Wu  Continue Program? (yes/no)  no  Program has shut down | InvalidEnter bag size:  1 for regular size  2 for large size  1  Enter weight: 9.25  Good bags:1  Bad bags:0  Total bags:1  Program by Yanzhang Wu  Continue Program? (yes/no)  yes  Enter bag size:  1 for regular size  2 for large size  2  Enter weight: 15  Good bags:1  Bad bags:1  Total bags:2  Program by Yanzhang Wu  Continue Program? (yes/no)  no  Program has shut down bag size entered | Matches, one good bag and one bad bag, correct report, program exits |
| hello | Enter bag size:  1 for regular size  2 for large size  hello  Invalid bag size entered.  Program by Yanzhang Wu  Continue Program? (yes/no) | Enter bag size:  1 for regular size  2 for large size  hello  Invalid bag size entered.  Program by Yanzhang Wu  Continue Program? (yes/no) | Matches, invalid bag size entered, ask user to input again |
| 0 | Enter bag size:  1 for regular size  2 for large size  0  Invalid bag size entered.  Program by Yanzhang Wu  Continue Program? (yes/no) | Enter bag size:  1 for regular size  2 for large size  0  Invalid bag size entered.  Program by Yanzhang Wu  Continue Program? (yes/no) | Matches, invalid bag size entered, ask user to input again |
| 1  9.25  yes  hello  yes  2  15  no | Enter bag size:  1 for regular size  2 for large size  1  Enter weight: 9.25  Good bags:1  Bad bags:0  Total bags:1  Program by Yanzhang Wu  Continue Program? (yes/no)  yes  Enter bag size:  1 for regular size  2 for large size  hello  Invalid bag size entered.  Program by Yanzhang Wu  Continue Program? (yes/no)  yes  Enter bag size:  1 for regular size  2 for large size  2  Enter weight: 15  Good bags:1  Bad bags:1  Total bags:2  Program by Yanzhang Wu  Continue Program? (yes/no)  no  Program has shut down | Enter bag size:  1 for regular size  2 for large size  1  Enter weight: 9.25  Good bags:1  Bad bags:0  Total bags:1  Program by Yanzhang Wu  Continue Program? (yes/no)  yes  Enter bag size:  1 for regular size  2 for large size  hello  Invalid bag size entered.  Program by Yanzhang Wu  Continue Program? (yes/no)  yes  Enter bag size:  1 for regular size  2 for large size  2  Enter weight: 15  Good bags:1  Bad bags:1  Total bags:2  Program by Yanzhang Wu  Continue Program? (yes/no)  no  Program has shut down | Matches, one good bag, one invalid input, one bad bag, correct report, invalid input doesn’t count, program exits |

## Table 3: Test Plan for method isBagCorrectWeight()

|  |  |  |  |
| --- | --- | --- | --- |
| Field values | Expected return value | Actual return value | Description |
| size = 1  weight = 9.24 | true | true | Matches |
| size = 1  weight = 9.25 | true | true | Matches |
| size = 1  weight = 9.26 | true | true | Matches |
| size = 2  weight = 15.74 | true | true | Matches |
| size = 2  weight = 15.75 | true | true | Matches |
| size = 2  weight = 15.76 | true | true | Matches |
| size = 1  weight = 9.2399 | false | false | Matches |
| size = 1  weight = 9.2601 | false | false | Matches |
| size = 2  weight = 15.7399 | false | false | Matches |
| size = 2  weight = 15.7601 | false | false | Matches |

# Task 4: Translate the Algorithm into Java

## Class Assignment02

# Text Description automatically generated

Figure 4. class Assignment02 - 1

# Text Description automatically generated

Figure 5. class Assignment02 - 2

# Graphical user interface, text, application Description automatically generated

Figure 6. class Assignment02 - 3

# Graphical user interface, text, application, email Description automatically generated

Figure 7. class Assignment02 – 4

## Class PotatoChipBag

Text

Description automatically generated

Figure 8. class PotatoChipBag - 1

Text

Description automatically generated

Figure 9. class PotatoChipBag - 2

Graphical user interface, text, application, email

Description automatically generated

Figure 10. class PotatoChipBag - 3

Graphical user interface, text, application, email

Description automatically generated

Figure 11. class PotatoChipBag – 4

## class User

Text

Description automatically generated

Figure 12. class User - 1

Graphical user interface, text, application

Description automatically generated

Figure 13. class User - 2

Text

Description automatically generated

Figure 14. class User – 3

# Task 5: Compile and Test Your Program

|  |  |  |  |
| --- | --- | --- | --- |
| Input | Expected Output | Actual Output | Description |
| 1  9.25  yes  1  9.23  yes  2  15.74  yes  2  15.73  no | Enter bag size:  1 for regular size  2 for large size  1  Enter weight: 9.25  Good bags:1  Bad bags:0  Total bags:1  Program by Yanzhang Wu  Continue Program? (yes/no)  yes  Enter bag size:  1 for regular size  2 for large size  1  Enter weight: 9.23  Good bags:1  Bad bags:1  Total bags:2  Program by Yanzhang Wu  Continue Program? (yes/no)  yes  Enter bag size:  1 for regular size  2 for large size  2  Enter weight: 15.74  Good bags:2  Bad bags:1  Total bags:3  Program by Yanzhang Wu  Continue Program? (yes/no)  yes  Enter bag size:  1 for regular size  2 for large size  2  Enter weight: 15.73  Good bags:2  Bad bags:2  Total bags:4  Program by Yanzhang Wu  Continue Program? (yes/no)  no  Program has shut down | Enter bag size:  1 for regular size  2 for large size  1  Enter weight: 9.25  Good bags:1  Bad bags:0  Total bags:1  Program by Yanzhang Wu  Continue Program? (yes/no)  yes  Enter bag size:  1 for regular size  2 for large size  1  Enter weight: 9.23  Good bags:1  Bad bags:1  Total bags:2  Program by Yanzhang Wu  Continue Program? (yes/no)  yes  Enter bag size:  1 for regular size  2 for large size  2  Enter weight: 15.74  Good bags:2  Bad bags:1  Total bags:3  Program by Yanzhang Wu  Continue Program? (yes/no)  yes  Enter bag size:  1 for regular size  2 for large size  2  Enter weight: 15.73  Good bags:2  Bad bags:2  Total bags:4  Program by Yanzhang Wu  Continue Program? (yes/no)  no  Program has shut down | Matches, two good bags and two bad bags, loop works as expected. |
| hello  0  YES  0  NO | Enter bag size:  1 for regular size  2 for large size  hello  Invalid bag size entered.  Program by Yanzhang Wu  Continue Program? (yes/no)  0  Invalid input. Please enter "yes" or "no"  YES  Enter bag size:  1 for regular size  2 for large size  0  Invalid bag size entered.  Program by Yanzhang Wu  Continue Program? (yes/no)  NO  Program has shut down | Enter bag size:  1 for regular size  2 for large size  hello  Invalid bag size entered.  Program by Yanzhang Wu  Continue Program? (yes/no)  0  Invalid input. Please enter "yes" or "no"  YES  Enter bag size:  1 for regular size  2 for large size  0  Invalid bag size entered.  Program by Yanzhang Wu  Continue Program? (yes/no)  NO  Program has shut down | Matches. Invalid input for bag size and the program asks user to continue or not. Invalid input for the choice of continuing the program, and the program outputs hints and asks user to input again. “yes” and “no” are not case sensitive. |
| 1  0  -5  hello  9  no | Enter bag size:  1 for regular size  2 for large size  1  Enter weight: 0  Invalid input. Please enter the correct weight:  -5  Invalid input. Please enter the correct weight:  hello  Invalid input. Please enter the correct weight:  9  Good bags:0  Bad bags:1  Total bags:1  Program by Yanzhang Wu  Continue Program? (yes/no)  no  Program has shut down | Enter bag size:  1 for regular size  2 for large size  1  Enter weight: 0  Invalid input. Please enter the correct weight:  -5  Invalid input. Please enter the correct weight:  hello  Invalid input. Please enter the correct weight:  9  Good bags:0  Bad bags:1  Total bags:1  Program by Yanzhang Wu  Continue Program? (yes/no)  no  Program has shut down | Matches. Invalid input for weight, program will ask user input again. |
| 1  9.26  YES  Hello  Yes  2  15.76  no | Enter bag size:  1 for regular size  2 for large size  1  Enter weight: 9.26  Good bags:1  Bad bags:0  Total bags:1  Program by Yanzhang Wu  Continue Program? (yes/no)  YES  Enter bag size:  1 for regular size  2 for large size  hello  Invalid bag size entered.  Program by Yanzhang Wu  Continue Program? (yes/no)  Yes  Enter bag size:  1 for regular size  2 for large size  2  Enter weight: 15.76  Good bags:2  Bad bags:0  Total bags:2  Program by Yanzhang Wu  Continue Program? (yes/no)  no  Program has shut down | Enter bag size:  1 for regular size  2 for large size  1  Enter weight: 9.26  Good bags:1  Bad bags:0  Total bags:1  Program by Yanzhang Wu  Continue Program? (yes/no)  YES  Enter bag size:  1 for regular size  2 for large size  hello  Invalid bag size entered.  Program by Yanzhang Wu  Continue Program? (yes/no)  Yes  Enter bag size:  1 for regular size  2 for large size  2  Enter weight: 15.76  Good bags:2  Bad bags:0  Total bags:2  Program by Yanzhang Wu  Continue Program? (yes/no)  no  Program has shut down | Matches. A good bag then a invalid input then a bad bag. Program counts bags correctly. |

Text

Description automatically generated

Figure . test case 1

Text

Description automatically generated

Figure . test case 2

Text, letter

Description automatically generated

Figure . test case 3

Text

Description automatically generated

Figure . test case 4