

King Saud University
College of Computer and Information Sciences
CSC111 – Fall 2021
Lab Final Exam

- مدة الاختبار ساعتين. من 7 مساءً حتى 9 مساءً يوم الإثنين 13 ديسمبر 2021.
- لن يتم التسامح في الغش. ومن يغش أو يسمح بالغش فدرجته صفر.
- التسليم قبل الساعة التاسعة مساءً. أي تسليم متأخر لن يقبل.
- اكتب اسمك ورقمك الجامعي ووقت شعبتك في بداية كل كلاس كملاحظه. خصم درجة في حال لم تقم بذلك.

```
// Firstname Lastname  
// id  
// Section time
```

توزيع الدرجات: 25 درجة هي الدرجة الكاملة للاختبار:

- 5 درجة للسؤال الأول.
- 5 درجات للسؤال الثاني.
- 15 درجات للسؤال الثالث.

Create one Project that will contain all classes in this exam. You are to submit one project only.

Question 1 (5 points)

Write a Java Program that will read an integer **n** representing the side of a square and a character **c**. Then print a Hollow square with side **n** on the screen using the character **c**. (مربع فاضي ومحيطه الحرف)

Your program should:

1. Continuously ask the user to enter a number and a character.
2. Print a full square with the character.
3. Stop when user enter -1 as the number, print “Goodbye!” and end the program.

Name your class **Shape**.

Sample run 1:

```
Please enter:
A number > 3
A char > A
The square is:
AAA
A A
AAA

Please enter:
A number > 5
A char > &
The square is:
&&&&&
&  &
&  &
&  &
&&&&&

Please enter:
A number > -1
Goodbye!
```

Sample run 2:

```
Please enter:  
A number > -1  
Goodbye!
```

Question 2 (5 points)

Write a Java program that keeps reading names and stops if the name meets the following rules:

1. It has more than 5 characters.
2. It starts with 'a'. ('A' is not acceptable).

Make sure to print all the reasons why the program didn't accept the name.

Note: to get a character from a String use `charAt(index)`, where *index* is the location of the character. For example, `name = "Ali"`, `name.charAt(0)` is equal to 'A', `name.charAt(1)` is equal to 'l' and so on.

Note: to get the number of characters in a String, use the method `length()`. For example, `name = "Ali"`, `name.length()` is equal to 3.

Name your class **MyName**.

Sample run1:

```
Enter a name: Ali  
The name has 5 or less characters.  
The name doesn't start with 'a'  
Enter a name: bassam  
The name doesn't start with 'a'.  
Enter a name: ahmad  
The name has 5 or less characters.  
Enter a name: Saad  
The name has 5 or less characters.  
The name doesn't start with 'a'  
Enter a name: abdulaziz  
Accepted.
```

Question 3 (15 points)

Write a class **Receipt** that stores a list of items' names, quantities and prices in three lists respectively. The class allows the user to add an item to the receipt, look for an item in the receipt by name, and display the receipt. Here is the UML diagram:

TestReceipt	Points (6)
+ <u>main()</u>	6

Receipt	Points (9)
-names[]: String -quantities[]: int -prices[]: double -nItems: int +MAX_SIZE: public static final int	1
+Receipt()	1
+getNItems():int	1
+addItem(name: String, quantity: int, price: double): boolean	2
+findItemByName(name: String) : int	2
+displayItem(i: int):boolean	1
+printReceipt():void	1

Write the class **Receipt** that has the following attributes:

- **names** : a list containing names of the items
- **quantities** : a list containing quantities of the items
- **prices** : a list containing prices of the items
- **nItems** : current number of items in the list
- **MAX_SIZE** : max size of the list. Or max number of items, must be set to 100.

The methods are:

- **Receipt()**: a constructor that initializes three lists and nItems.
- **getNItems()** : returns the current number of items.
- **addItem**(name: String, quantity: int, price: double): adds an item with the given data to the list if possible and return true. If it is not possible to add anymore items or if the **quantity** is 0 or less, then the item is not added and false is returned.
- **findItemByName**(name: String): search for the item with a name that matches the **name** given in the argument. If found, then this method will return its index, if not found, -1 is returned.

- **displayItem**(i : int): displays all data of the item at index **i** as shown below, then return true. If the index **i** is not a valid index, returns false.

Example: for item name “milk” with quantity 5 and price 3.99 SR it will be displayed like:

milk, x5, 3.99SR

- **printReceipt**(): displays all the items’ data line by line. Then print the total bill of the receipt. (see sample run for examples)

Write a main class called **TestReceipt** with a **main method** that will do the following:

Creates a Receipt object, then displays a menu with four choices:

- “**add**” read an item information (name, quantity and price), then add the item to the receipt. If added successfully, print “Item was added!”. Otherwise, print “Item was NOT added!”.
- “**print**” display the details of all items in the receipt and print the total bill of the receipt (see the sample run for more details).
- “**find**” search for an item name in the receipt. If item found display that item information. if not, print “The item was not found!”
- “**exit**” print “Thanks! Goodbye :)” and end the program.

Important! Note:

1. If the user enter any input as menu choice other than the four choices above, your program should print “**Wrong input! Please try again.**”
2. All string comparasions in the program are **case insensitive**. (Case does not matter)

Sample run:

```
*****
Welcome :)
-----
Please enter one of the following options:
1) add ==> this allows you to add an item to the receipt
2) print ==> this allows you to print receipt.
3) find ==> this allows you to search for an item name.
4) exit ==> to end this program
*****
Enter your option :> abcd
Wrong input! Please try again.
*****
Welcome :)
-----
Please enter one of the following options:
1) add ==> this allows you to add an item to the receipt
2) print ==> this allows you to print receipt.
3) find ==> this allows you to search for an item name.
4) exit ==> to end this program
*****
Enter your option :> print
=====
Total: 0.0
=====
*****
Welcome :)
-----
Please enter one of the following options:
1) add ==> this allows you to add an item to the receipt
2) print ==> this allows you to print receipt.
3) find ==> this allows you to search for an item name.
4) exit ==> to end this program
*****
Enter your option :> find
Please enter the item name: water
The item is not found!
*****
Welcome :)
-----
Please enter one of the following options:
1) add ==> this allows you to add an item to the receipt
2) print ==> this allows you to print receipt.
3) find ==> this allows you to search for an item name.
4) exit ==> to end this program
*****
Enter your option :> add
Please enter the name, quantity, and price of item :
water 3 1.5
Item was added!
*****
Welcome :)
-----
Please enter one of the following options:
1) add ==> this allows you to add an item to the receipt
2) print ==> this allows you to print receipt.
3) find ==> this allows you to search for an item name.
4) exit ==> to end this program
*****
Enter your option :> add
Please enter the name, quantity, and price of item :
milk 2 12
Item was added!
*****
Welcome :)
-----
Please enter one of the following options:
1) add ==> this allows you to add an item to the receipt
2) print ==> this allows you to print receipt.
3) find ==> this allows you to search for an item name.
4) exit ==> to end this program
*****
Enter your option :> add
Please enter the name, quantity, and price of item :
cola 0 2.5
Item was NOT added!
*****
Welcome :)
-----
Please enter one of the following options:
1) add ==> this allows you to add an item to the receipt
```

```
2) print ==> this allows you to print receipt.
3) find ==> this allows you to search for an item name.
4) exit ==> to end this program
*****
Enter your option :> print
water, x3, 1.5SR
milk, x2, 12.0SR
=====
Total: 28.5
=====
*****
Welcome :)
-----
Please enter one of the following options:
1) add ==> this allows you to add an item to the receipt
2) print ==> this allows you to print receipt.
3) find ==> this allows you to search for an item name.
4) exit ==> to end this program
*****
Enter your option :> find
Please enter the item name: water
water, x3, 1.5SR
*****
Welcome :)
-----
Please enter one of the following options:
1) add ==> this allows you to add an item to the receipt
2) print ==> this allows you to print receipt.
3) find ==> this allows you to search for an item name.
4) exit ==> to end this program
*****
Enter your option :> exit
Thanks! Goodbye :)
```