

KING SAUD UNIVERSITY
COLLEGE OF COMPUTER AND INFORMATION SCIENCES
Computer Science Department

CSC 111 Computer Programming - I	Lab Exam (1:30 hours) 1 st Semester 1446 - 2024	Signature:
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Name:	ID:	Completed at:
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Instructions:

1. Create a project with your full name as *FirstName_LastName*.
2. In the first 3 lines, write your *full name*, *your ID*, and *your lab section or time* as comments.
3. Use the specified variable and class names.
4. Name the exported compressed file with your information *ID_FirstName_LastName.zip*.
5. Submit your code to the lab section in blackboard.
6. If you have any issue, let the lab instructor know.

Question 1) [10 Points] Write the class **Laptop** as described below:

A. [1.2 Points] Laptop Attributes:

- **name**: the laptop name.
- **cpu**: either "INTEL", "AMD", or "OTHER".
- **ram**: Volatile storage in GB. The value must be 2 or greater.
- **storage**: Permanent storage in GB. The value must be 128 or greater.
- **screen**: Screen size in inch. The value must be between 10 and 17.5 (inclusive).
- **weight**: laptop weight in KG. The value must be 0.5 or greater.

Note: the values must be enforced in the setters and constructors.

Laptop
- name : String
- cpu : String
- ram : int
- storage : int
- screen : double
- weight : double
+ Laptop()
+ Laptop (name:String, cpu:String, ram:int, storage:int, screen:double, weight:double)
+ calculatePrice() : double
+ equals (other:Laptop) : bool
+ display() : void
+ Setters & Getters

B. [6.8 Points] Laptop Methods:

- [0.6 Point] **Laptop()**: the default constructor, sets name as "", cpu as "OTHER", and variables to the lowest value allowed.
- [0.6 Point] **Laptop**(name:String, cpu:String, ram:int, storage:int, screen:double, weight:double): the parameterized constructor.
- [1.5 Point] **calculatePrice()**: returns the laptop price. Here is how to calculate the laptop price

Base Price	RAM	CPU	Storage	Screen	Weight
300	*0.25 for every GB	INTEL = 200 AMD = 180 OTHER = 100	+0.5 for every GB	+50 for every inch after 10 inches	-10 for every after 0.5 kg

$$\text{Price} = 300 * 0.25 * \text{RAM} + \text{CPU} + 0.5 * \text{STORAGE} + 50 * (\text{SCREEN} - 10) - 10 * (\text{WEIGHT} - 0.5)$$

- [0.6 Points] **equals**(other:Laptop): return true if all the attributes are equal to *other* attribute.
- [0.6 Points] **display()**: prints the laptop information as follows:

NAME, CPU, RAM GB RAM, STORAGE GB, SCREEN inch screen, WEIGHT KG. Price is PRICE

- [1.7 Points] **Setters**: sets the received value if it doesn't violate the attribute description.
 - If **cpu** is set an incorrect value, set it to "OTHER".
 - If **ram** is set to a value below 2, set it to 2.
 - If **storage** is set to a value below 128, set it to 128.
 - If **screen** is set to a value below 10 or higher than 17.5, set it to 10.
 - If **weight** is set to a value below 0.5, set it to 0.5.
- [1.2 Points] **Getters**: return the values of the attributes.

C. [2 Points] Write class **TestLaptop** with a main method. In the main method:

- [0.25 Point] Create a laptop using the parametrized constructor with the following information:

Variable	Value	Variable	Value
name	KSU_Laptop	storage	512
cpu	INTEL	screen	14.2
ram	16	weight	1.33

- [0.25 Point] Create another laptop using the default constructor.
- [0.25 Point] Ask the user to enter the other laptop information.
- [0.5 Point] Display both laptops
- [0.25 Point] Check if they are equal and print the result.
- [0.5 Point] Check and display which laptop is more expensive (or if they have the same price).

D. Sample Runs

```
Enter laptop name: Exam_Laptop
Enter CPU (INTEL/AMD/OTHER): AMD
Enter RAM (GB): 32
Enter storage (GB): 1024
Enter screen size (inch): 17
Enter weight (KG): 3
```

KSU_Laptop, INTEL, 16 GB RAM, 512 GB, 14.2 inch screen, 1.33 KG. Price is 1857.7

Exam_Laptop, AMD, 32 GB RAM, 1024 GB, 17.0 inch screen, 3.0 KG. Price is 3417.0

Are the laptops equal? false

Exam_Laptop is more expensive than KSU_Laptop

```
Enter laptop name: Test_Laptop
Enter CPU (INTEL/AMD/OTHER): M1
Enter RAM (GB): 1
Enter storage (GB): 50
Enter screen size (inch): 200.5
Enter weight (KG): -3.3
```

KSU_Laptop, INTEL, 16 GB RAM, 512 GB, 14.2 inch screen, 1.33 KG. Price is 1857.7

Test_Laptop, OTHER, 2 GB RAM, 128 GB, 10.0 inch screen, 0.5 KG. Price is 314.0

Are the laptops equal? false

KSU_Laptop is more expensive than Test_Laptop