

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

CSC 111 Computer Programming - I	Lab Exam (1:30 hours) 1st 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
- <code>name</code> : String
- <code>cpu</code> : String
- <code>ram</code> : int
- <code>storage</code> : int
- <code>screen</code> : double
- <code>weight</code> : double
+ <code>Laptop()</code>
+ <code>Laptop(name:String, cpu:String, ram:int, storage:int, screen:double, weight:double)</code>
+ <code>calculatePrice() : double</code>
+ <code>equals(other:Laptop) : boolean</code>
+ <code>display() : void</code>
+ 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 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
<i>name</i>	KSU_Laptop	<i>storage</i>	512
<i>cpu</i>	INTEL	<i>screen</i>	14.2
<i>ram</i>	16	<i>weight</i>	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
```

```
Test_Laptop, OTHER, 2 GB RAM, 128 GB, 10.0 inch screen, 0.5 KG. Price is 314.6
```

```
Are the laptops equal? false
KSU_Laptop is more expensive than Test_Laptop
```