BINUS University

Academic Career: ***Undergraduate / ~~Master~~ / ~~Doctoral~~ *)***			**Class Program:** ***~~International~~/Regular/~~Smart Program~~/Global Class*)***
☑ **Mid Exam** ☐ **Final Exam** ☐ **Short Term Exam** ☐ **Others Exam : _____**			**Term : ~~Odd~~/Even/~~Short~~ *)**
☑ **Kemanggisan** ☑ **Alam Sutera** ☑ **Bekasi** ☐ **Senayan** ☐ **Bandung** ☐ **Malang**			**Academic Year :** **2021 / 2022**
Faculty /Dept. : School of Computer Science		Deadline	Day/Date : Wednesday/ 20th Apr 2022 Time : 13:00 – 16:20(200 Minutes)
Code - Course : COMP6708001 – Object Oriented Programming		Class	: All Classes
Lecturer : Team		Exam Type	: Online
*) *Strikethrough the unnecessary items*			
The penalty for CHEATING is DROP OUT!!!			

Learning Outcomes:

LO 1 : Differentiate Between Conventional Programming and Object Oriented Programming
LO 2 : Describe the Main Feature of Object Oriented Programming
LO 3 : Describe the Additional Feature of Object Oriented Programming
LO 4 : Construct a program with Object Oriented Programming

I. Case (100%)

[LO 1, LO 2, LO 3 & LO 4, 100 point]

Aibenes, a famous guitar producer is asking you to create Java program that can simulate list of their guitar designs. Guitars type that this factory produces are:

1. **Acoustic Guitar**
2. **Electric Guitar**
3. **Acoustic Electric Guitar**

Acoustic Guitar is a guitar that has sound hole and can be played anytime without electricity power. This guitar does not have pickup. It can only produce one type of sound, either **warm or bright**.

Electric Guitar is a guitar that should be connected to electricity power. It has a **pickup** that can receive strings sound and transmit the signal to amplifier. This pickup is a must in designing electric guitar for it does not have sound hole. We cannot hear electric guitar sound without pickup. This pickup will have **tone control, volume control and switch position**. With electric guitar, from **switch 1 until switch 4**, we can produce various sound that suitable for music genre **Funk, Jazz, Blues and Rock**.

Acoustic Electric Guitar is a guitar that has sound hole but also has a **pickup** like electric guitar. Different from electric guitar, acoustic electric's pickup will have **tone control**, **volume control but no switch position**. So it is limited in producing various sound compared to electric guitar. This guitar can

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also work like acoustic guitar, so we can hear its sound even without any pickup. All pickups for acoustic electric guitar will have default same settings.

First, program will show menu as follow.

```
1. Build Guitar
2. Display List of Guitar
3. Exit
Choose menu[1..3]:
```

If user choose "**Build Guitar**" user will be given options to choose what type of guitar user want to build. If user choose **Acoustic Guitar**, program will random sound type of acoustic guitar, either **warm** or **bright**. If user choose **Electric Guitar**, program will ask user to input default settings for **switch position, tone, volume**. If user choose **Acoustic Electric Guitar**, program will set default settings of **sound type as crunch, tone and volume become 0**. This will be default settings for all acoustic electric guitar build.

```
1. Build Guitar
2. Display List of Guitar
3. Exit
Choose menu[1..3]: 1

1.Acoustic
2.Electric
3.Acoustic Electric
Input guitar type[1..3]: 2
Input switch position: 2
Input tone: 1
Input volume: 1
```

If user choose "**Display List of Guitar**", display list of guitar that have been built by user.

```
1. Build Guitar
2. Display List of Guitar
3. Exit
Choose menu[1..3]: 2
[GuitarType]-[GuitarSoundType]-[Tone]-[Volume]-[SwitchPosition]
Electric Guitar - Jazz - 1 - 1 - 2
Electric Guitar - Rock - 4 - 5 - 4
Acoustic Guitar - warm
Electric Guitar - Blues - 3 - 3 - 3
Acoustic Guitar - bright
Acoustic Electric Guitar - crunch - 0 - 0
Acoustic Electric Guitar - crunch - 0 - 0
```

If user choose "**Exit**", program will stop.

Assume that user will always give correct input, so you don't have to validate input.

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You will need to submit **java code** that implements:

1. Class and Object [**10 point]**
2. Constructor **[10 point]**
3. Encapsulation **[10 point]**
4. Inheritance **[10 point]**
5. Polymorphism **[10 point]**
6. Composition [and|or] aggregation. **You have to explain the reason why you implement one of those or both composition and aggregation. Give comments on your code. [10 point]**
7. ArrayList or vector **[10 point]**

Scoring will be based on how you can implement Object Oriented Concepts as stated above. The implementation should show the advantage of Object Oriented compared to conventional programming languages, which are:

1. reduce line of codes **[10 point]**
2. reduce duplicate code **[10 point]**
3. use memory efficiently **[10 point]**

-- Good Luck --

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