**SE311 SPRING 2023-2024 / 22-03-2024**
**Lab Work 5 – Command Pattern**
**Goal: Practice on Command Pattern**

Imagine, we have a new PC with a single core CPU where there are threads in a task queue. For the sake of example, the tasks are just change the color on the screen and there are four different tasks: makeRed, makeBlue, makeGreen and makeYellow. In the big picture, user adds tasks to the task queue, which will become a thread. A task scheduler then retrieves the threads. Later, the threads will have a chance to run on the CPU.

Before starting your implementation, read the lab sheet as a whole and map the problem participants to Command Pattern participants. Also, do not forget to check CommandPattern.java example. You will implement your code by getting help from it.

**Tasks** and **Concrete Tasks:** You have four different tasks, as they are the mentioned previously.

**PC** and **CPU:** This the object structure. CPU is the concrete object that defines makeRed, makeBlue, makeGreen and makeYellow methods. These methods will affect the attribute and therefore the state of the screen. CPU has one attribute: screen_color. It is a string that represents the color on the screen. After one method is called, please print the effect also, e.g.: “The screen now shows BLUE…”

**TaskScheduler:** Retrieves the thread with new task from the task queue and makes the CPU perform the appropriate task.

**OS:** This is responsible for setting the scene by creating “Task Queue”, “Device”, “Task Scheduler” and “Command” objects. Several command objects can be added to the Task Queue. The Task scheduler will retrieve the tasks in the order of first come first serve.

Also, implement one more method called “void run()” to make **TaskScheduler** object to run tasks on receiver.

Add a macro command in which all four colors are combined. It will run all four tasks and will change the screen into “white”. Please refer to our example code for macro command implementation.

Lastly, implement an “undo” feature. When **undo** task is done, the screen color should revert to its previous color. Again, refer to our example code for “undo” implementation.

Write a main to test your design by creating an OS object and populate the task queue with color change tasks and macro command. Then, task scheduler “run” methods by retrieving them from the queue.

Lastly, test your “undo”.