

Overview

In this assignment you will be implementing a task list (or to-do list). It involves writing 3 different classes, including the driver. It is recommended that you write the `Task` class and then write a driver (tester) program to ensure that it works before putting everything together (similar to the tester programs we provided for you in the last assignment).

Goals

Write a multi-class program with a driver.

Class and File Naming

Name your classes as follows:

`Task` in source file `Task.java`

`TaskList` in source file `TaskList.java` `TaskDriver` in source file `TaskDriver.java`

What to Implement

Based on the following UML diagrams, implement the required classes, `Task`, `TaskList`, and `TaskDriver`. More information can be found in the JavaDoc documentation for each file.

The Task Class

This class represents a task and should be saved in the file `Task.java` .

Task
- name : String - priority : int
«constructor» Task() «constructor» Task(t: String, p: int) + getName() : String + getPriority(): int + setName(t : String) : void + setPriority(p: int) : void + toString() : String + equals(o : Object) : boolean

Brief descriptions of the Task class instance variables and methods

Field	Description
task	A <code>String</code> representing the task name, should be limited to a maximum of 35 characters
priority	An <code>int</code> in the range 1 - 5 inclusive

Method	Description
Task()	Constructor that defaults to <code>none</code> and <code>1</code> .
Task(String,int)	Sets <code>task</code> to first argument and <code>priority</code> to second argument. If priority is out of range, set to <code>1</code> . If task name is empty <code>""</code> , set to <code>"none"</code> . Follows size restrictions for <code>task</code> field.
getName()	Returns the name of the task
getPriority()	Returns the value of the priority
setName(String)	Sets the name of the task. Should not change current name if attempt is made to set empty name <code>""</code> . Follows size restrictions for <code>task</code> field.
setPriority(int)	Sets the priority of the task. If out of range, does not change current priority.
toString()	Returns a string in the format <code>Name : Priority</code>
equals(Object)	Two <code>Task</code> objects are equal if they have the same name (case insensitive) and the same priority value

The TaskList Class

This class represents a list of tasks and should be saved in the file TaskList.java .

TaskList
- max : int (20) - list : Task[] - count : int - order : boolean
«constructor» TaskList() «constructor» TaskList(tasks: Task[]) + getCount() : int + addTask (t : Task) : void + deleteTask(p : int) : void + setOrder(newOrder : boolean) : void + getOrder() : boolean + sort() : Task[] + next() : Task + toString() : String + equals(o : Object) : boolean

Brief descriptions of the TaskList class instance variables and methods

Field	Description
max	A final variable representing the maximum size of the task list
count	Number of tasks currently in the list, also indicates first "open" position in the array.
list	Contains the list of Task objects
order	true represents sorting list in ascending order (1 to 5 priority) false represents sorting list in descending order (5 to 1 priority)

Method	Description
Tasklist()	Creates an array of <code>max</code> default <code>Task</code> items.
TaskList(Task[])	Creates a new task list based on parameter of an array of <code>Task</code> items. Size of <code>list</code> created should be <code>max</code> , with up to <code>max</code> items from parameter copied into <code>list</code> .
getCount()	Returns the number of tasks in the list.
addTask(Task)	If list is not full, adds a new task to the end of the list of actual tasks in the list. If list is full, nothing is added.
deleteTask (int)	Removes a task based on position. Array should be adjusted accordingly to not have "empty" tasks in the list (i.e., "condense" the list). Validation should be done to make sure the item being deleted exists.
setOrder(boolean)	Sets <code>order</code> field.
getOrder()	Returns <code>order</code> field.
sort()	Sorts the tasks based on priority, returns the sorted list. Sorts in ascending order (1 to 5) if <code>order</code> is <code>true</code> , descending order (5 to 1) otherwise. Precondition: TaskList count is greater than 0. Postcondition: list of tasks in the <code>TaskList</code> are unchanged
next()	This method returns the next highest priority task based on sorting. If list is empty, return <code>null</code>
toString()	Return a single <code>String</code> containing a list of all <code>count</code> tasks in a format of <code>#. Task</code> , one per line, with <code>#</code> starting at <code>1</code> . Returns an empty <code>String</code> if the list has no tasks.
equals(Object)	Determines if two TaskList objects are equal; two TaskList objects are equal if they contain the same tasks with the same priorities

The Driver Program: `TaskDriver.java`

After you have these two files, you also need to write a program with a `main()` method. This will be the driver for the entire collection of files/classes. This file should be saved as `TaskDriver.java`.

This file will implement a menu-based program. It should allow for the following options on a `TaskList` in the program.

1. Print the task list
2. Print the number of tasks
3. Add a task
4. Remove a task (based on position)
5. Print the next task to be done (output `NONE!` if no tasks in list)
6. Print the sorted tasks by current sort order priority
7. Change the priority scale
8. Quit

See the example run for details.

Points to Think About

- You need to think about how you want to handle "empty" spaces in the array or if you want empty spaces at all...
- Don't forget to update `count` when you add or remove Tasks
- You can write additional `static` methods in the main `TaskDriver` class to simplify the logic, but it's not required.
- Be careful of shallow vs. deep copies - this will be tested for in Web-CAT.

Grading Notes

- You must have a completed Collaboration document in Canvas in order for the program to be graded.
- Your program should include the basic "header" documentation information seen in the example code. Replace the correct portions with your information.
- Look on Canvas for the "How to Do Your Program Header" file for more information under Resources
- You may **not** use an `ArrayList` or `List` for this assignment - it defeats the purpose of the assignment.

Sample run: (user input highlighted)

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 1

Task list is:

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 2

Number of tasks: 0

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 5

The next task to be done is NONE!

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done

6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 6

Sorted tasks are:

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 3

Enter task:

Make dinner for myself

Enter priority (1-5)

3

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 1

Task list is:

1. Make dinner for myself : 3

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 2

Number of tasks: 1

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 5

The next task to be done is Make dinner for myself : 3

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 6

Sorted tasks are:

1. Make dinner for myself : 3

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 3

Enter task:

Finish programming assignment early

Enter priority (1-5)

2

1. Print the list of tasks
2. Print the number of tasks
3. Add a task

4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 1

Task list is:

1. Make dinner for myself : 3
2. Finish programming assignment early : 2

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 2

Number of tasks: 2

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 5

The next task to be done is Finish programming assignment early : 2

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 6

Sorted tasks are:

1. Finish programming assignment early : 2
2. Make dinner for myself : 3

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 1

Task list is:

1. Make dinner for myself : 3
2. Finish programming assignment early : 2

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 3

Enter task:

Start the programming assignment early!

Enter priority (1-5)

1

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 1

Task list is:

1. Make dinner for myself : 3

2. Finish programming assignment early : 2
3. Start the programming assignment ea : 1

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 3

Enter task:

Eat dinner

Enter priority (1-5)

3

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 1

Task list is:

1. Make dinner for myself : 3
2. Finish programming assignment early : 2
3. Start the programming assignment ea : 1
4. Eat dinner : 3

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 2

Number of tasks: 4

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 5

The next task to be done is Start the programming assignment ea : 1

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 6

Sorted tasks are:

1. Start the programming assignment ea : 1
2. Finish programming assignment early : 2
3. Make dinner for myself : 3
4. Eat dinner : 3

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 7

Enter 1 to make 1 highest priority, anything else will make 5 highest priority.
2

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task

5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 6

Sorted tasks are:

1. Make dinner for myself : 3
2. Eat dinner : 3
3. Finish programming assignment early : 2
4. Start the programming assignment ea : 1

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 1

Task list is:

1. Make dinner for myself : 3
2. Finish programming assignment early : 2
3. Start the programming assignment ea : 1
4. Eat dinner : 3

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 4

Here is the list of tasks:

1. Make dinner for myself : 3
2. Finish programming assignment early : 2
3. Start the programming assignment ea : 1
4. Eat dinner : 3

Enter number of task to delete

2

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 1

Task list is:

1. Make dinner for myself : 3
2. Start the programming assignment ea : 1
3. Eat dinner : 3

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 2

Number of tasks: 3

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 5

The next task to be done is Make dinner for myself : 3

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task

5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 7

Enter 1 to make 1 highest priority, anything else will make 5 highest priority.

1

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 6

Sorted tasks are:

1. Start the programming assignment ea : 1
2. Make dinner for myself : 3
3. Eat dinner : 3

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 1

Task list is:

1. Make dinner for myself : 3
2. Start the programming assignment ea : 1
3. Eat dinner : 3

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale

8. Quit

Enter choice: 4

Here is the list of tasks:

1. Make dinner for myself : 3
2. Start the programming assignment ea : 1
3. Eat dinner : 3

Enter number of task to delete

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1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 1

Task list is:

1. Make dinner for myself : 3
2. Start the programming assignment ea : 1
3. Eat dinner : 3

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 4

Here is the list of tasks:

1. Make dinner for myself : 3
2. Start the programming assignment ea : 1
3. Eat dinner : 3

Enter number of task to delete

2

1. Print the list of tasks

2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 4

Here is the list of tasks:

1. Make dinner for myself : 3
2. Eat dinner : 3

Enter number of task to delete

2

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 4

Here is the list of tasks:

1. Make dinner for myself : 3

Enter number of task to delete

1

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 1

Task list is:

1. Print the list of tasks

2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 2

Number of tasks: 0

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 4

Here is the list of tasks:

Enter number of task to delete

3

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 5

The next task to be done is NONE!

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale

8. Quit

Enter choice: 6

Sorted tasks are:

1. Print the list of tasks
2. Print the number of tasks
3. Add a task
4. Remove a task
5. Print the next task to be done
6. Sort the tasks by priority
7. Change the priority scale
8. Quit

Enter choice: 8