Karel The Alien

Submission Date: 24th of February 11:59 PM

1 Introduction

1.1 Submission

Submit a **zipped folder** that is **only** containing your Java source files (*.java) in course's Black Board.

Please use the following naming convention for the submitted folders:

YourPSLetter_CourseCode_Surname_Name_HWNumber_Semester
Example folder names:

- **PSA_COMP130_Surname_Name_HW1_S19**
- **PSB_COMP130_Surname_Name_HW1_S19**

Additional notes:

- Using the naming convention properly is important, **failing** to do so may be **penalized**.
- **Do not** use Turkish characters when naming files or folders.
- Submissions with unidentifiable names will be **disregarded** completely. (ex. "homework1", "project" etc.)
- Please **write your name** into the Java source file where it is asked for. **Failing** to do so may be **penalized**.
- If you are resubmitting to update your solution, simply append **v#** where # denotes the resubmission version. (i.e. **v2**)

1.2 Academic Honesty

Koç University's *Statement on Academic Honesty* holds for all the homeworks given in this course. Failing to comply with the statement will be penalized accordingly. If you are unsure whether your action violates the code of conduct, please consult with your instructor.

1.3 Aim of the Project

The aim of this project is to make you see just how powerful Karel the Robot can be as you use Karel to solve a variety of programming problems, practicing essential programming skills of well-designed decomposition into helper methods, good commenting of file and each method, and creative expression through your code. Breaking the problem apart elegantly will result in a bunch number of easy-to-read methods, each of which performs just one small task. So, make sure you decompose the problem into smaller and more manageable pieces.

1.4 Given Code

This part is optional but recommended as it will allow you to understand the given partitions of the code better. Do not change anything in the code if it is indicated to you by a comment. Below are the methods given to you in the code with their explanation.

1.4.1 Given Methods

The following method for you to use is already implemented. Please do not remove or change this method.

- void playThemeSong(String fileLocation) - Plays a part of "*jupiter*" by Gustav Holst from his orchestral suite "*The Planets*."

1.4.2 Given Constants

In the code, We have given you a constant value for you to work with (i.e THEME SONG is given at the bottom of the java file). You will use these constants as arguments for given methods. Since you did not learn methods in detail yet, necessary code is provided in the corresponding sections of the project. Please do not remove or edit this constant value.

1.5 Further Questions

For further questions **about the project** you may send an email to **course SLs** at [comp198-spring-19-sl-group@ku.edu.tr] and **Ayca Tuzmen** at [atuzmen@ku.edu.tr]. Note that it may take up to 24 hours before you receive a response so please ask your questions **before** it is too late. No questions will be answered when there is **less than two days** left for the submission.

2 Given Worlds

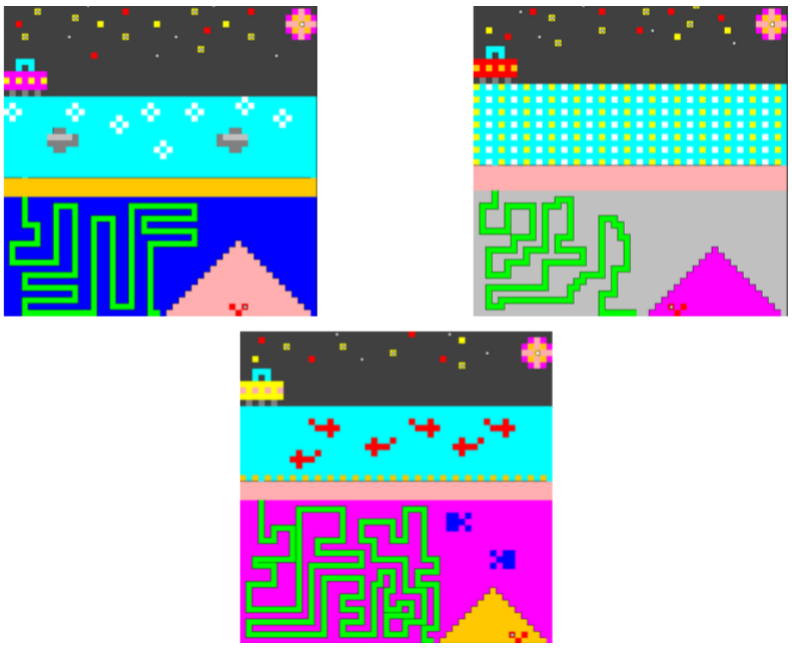

Figure 1: Three worlds for Karel the Alien

We have provided you 3 different worlds. Your code should work for all of these worlds as shown in Figure 1.

3 The Story

In a galaxy far far away, there lives a cute little alien called Karel The Alien. She has a very precious stone collection, comprising stones from planets all over the universe. She needs your help to collect these stones and bring back to her planet.

4 Project Tasks

This assignment consists of 4 main parts. In part 1, Karel needs to collect stones from the mini versions of planet, place them to her spaceship and eat red space foods on her way. In part 2, she needs to beam into the surface of a planet and find the tunnel by digging the floor. In Part 3, she needs to find a way to go through the tunnel; ascend and descend the pyramid to go inside it and get the stone from the sea creature. In Part 4, she has to bounce back to her planet.

Note: You're provided with a video clip for a clear perception.

4.1 Part 1 - Space Travel - 40 points

4.1.1 Task 1 - Collect and Dine

Karel needs to collect the beepers from **YELLOW** corners which represent other planets, eat red space foods, and not pick meteroid beepers from the space.
Everytime, Karel starts in the middle of her planet. So, you need to find a way to make sure she checks every line of space until she reaches her spaceship. Do not worry about crossing over her planet.

Hint: Karel has multiple spaceships but every one of them has a **CYAN** colored top. You may use Karel's color checking skills to find the ship.

4.1.2 Task 2 - Put and Divide Stones

Karel starts with an empty bag of beepers. Now that she has collected some beepers from varied number of planets, she has to put them in her spaceship. She will put them in the **DARKGRAY** corner of her ship, and then distribute them into 3 legs of the spaceship to be more balanced before takeoff.

Note: The number of beepers may not be divisible by 3. In that case, Karel needs to continue putting beepers to the legs in an unbalanced way. For instance, if Karel has 4 beepers and if you start putting beepers to the leftmost leg, that leg will have 2 beepers, and the other two legs will only have one beeper.

4.1.3 Task 3 - Take Position to Beam

Karel's transportation machine is placed inside the second leg of her ship. So she needs to go there now. Keep in mind that every ship is of exactly the same size.

4.2 Part 2 - There She Beams Down - 20 points

4.2.1 Task 1 - Beaming

At this point, Karel beams down to the ground. In every world assume the color of air is **CYAN**. She moves down on a single line and in every move she has to color the air **BLUE** and then back to **CYAN** to illustrate the motion of teleportation. When she reaches the ground, that means she has completed the beaming.

4.2.2 Task 2 - Digging

After she reaches the ground, she has to dig a tunnel. She turns the color of the ground to **GRAY**. Unlike beaming, the gray color stays **GRAY** as she moves.

4.3 Part 3 - Under The Sea - 30 points

4.3.1 Task 1 - The Tunnel

Nothing worth having comes easy. Karel needs to go through a tunnel now. The tunnel is always **GREEN** and is walled-off. But the size of the tunnel varies. After she exits the tunnel she arrives to the pyramid.

4.3.2 Task 2 - The Pyramid

The precious stone is inside the pyramid, but you will see the only entrance to the pyramid is from the bottom-right corner. To get there, Karel needs to ascend and then descend the pyramid one step at a time. The length of the stairs may differ, but the steps are always one block thick. After she reaches to the bottom-right corner, she can enter inside the pyramid.

4.3.3 Task 3 - Find the Sea Creature, Get the Stone

A sea creature lives somewhere in the pyramid. It is always **RED**, it always stands on the floor and has two hands. It has the stone in one of its hands. Karel needs to find this creature, check both of its hands and when she finds the stone, she has to take it. Creature will allow that and give the stone easily, after all she made it all this way.

4.4 Part 4 - Beam Me Up, Scotty! - 10 points

Karel has a friend called Scotty living in her planet. When she is done with her job she calls Scotty and he beams her up to their planet to celebrate her accomplishments! So you have one last thing to do, hang in there.

It is very easy how Karel turns back to her planet. She goes to very east and starts facing north, she just moves up until she reaches her planet. Then she thanks Scotty and get the exact position she started in the beginning. She comes to the middle of her planet facing west.

4.5 End of Project

Your project ends here. You may continue to tinker with the code to implement any desired features and discuss them with your section leader. **Do not** include any additional features that you implement after this point in to your submission.

Final Warning: Do not include anything beyond this point to your submission. Points may be deducted from your grade.