CSCE 452 Project #1 TAMU – PaintBot

Project description: TAMU PaintBot is a RRR robot as illustrated in Figure 1. We are going to build a simulation system for the robot. For convenience, all length units are in pixels (You can choose any other units depending on your programming tool). Link 1 has a length of 150 pixels. Link 2 has a length of 100 pixels. The distance between the paint brush and axis 3 is 75 pixels.

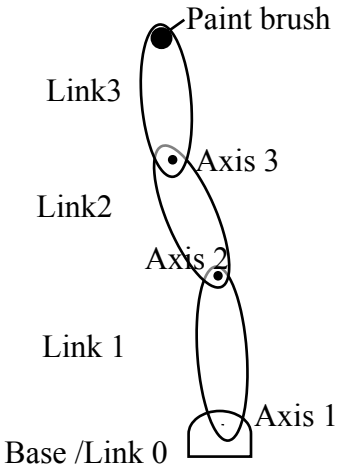

Figure 1. TAMU PaintBot

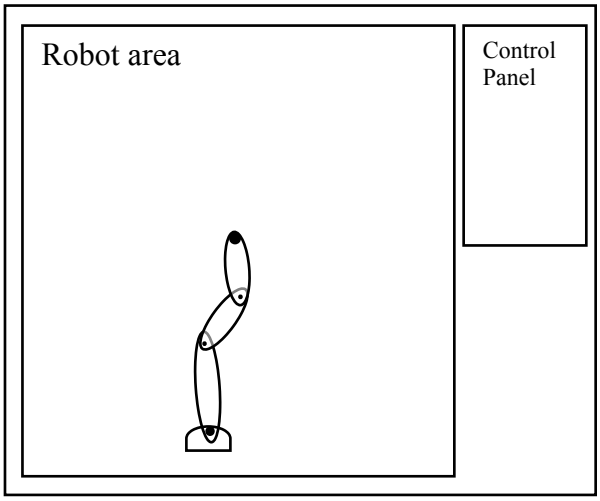

Figure 2. Simulation system interface

Figure 2 illustrates a sample interface layout. You can choose any language that you feel comfortable with. Due to the resolution limit of the projector in class, it is recommended that the interface is less than the projector resolution.

Functionalities required in the control panel are,

1. Joint control buttons: each joint has two buttons: counterclockwise and clockwise. For example, if the clockwise rotation button is clicked, the corresponding joint rotates clockwise by 1 degree.
2. Paint brush control button. If the paint brush button is clicked, it paints a filled circle co-centered with the brush. The diameter of the circle is 10 pixels.

The simulated robot system will be demonstrated in class. Grading is based on project website (20pts), in class demonstration (40pts), and peer review (40pts). There will be a paint-job competition in class to test your PaintBot. The wining team will get 5pts additional bonus point. The requirements for the project are,

1. Team management: Create a project team with three or four students. If you cannot find a team or a teammate in/after class, you post comments in google classroom to reach other students. Note that each team can have up to 5 members in total. PLEASE FIND YOUR TEAMMATES ASAP!
2. Each team should create a team site at github.tamu.edu. Please add me and your TA to your team (my netid is dzsong and your TA's netid is ericex1015 with emails dzsong@tamu.edu and ericex1015@tamu.edu). Please track the following items on your website for grading purpose (20pts):

a. Create sub directories for each project. You will work on five projects during the semester.
b. Team meeting log for current project (5pts).
c. Source code for current project (5pts)
d. Instructions for compiling and running the program (5pts).
e. Screenshot of the software interface (jpeg or png format) of the current project (5pts).

3. Peer Review (20 pts): You will be able to find a peer review form URL in our google classroom website. The filled form should be submitted via googleclass room as well. Do not evaluate yourself. The deadline for turning in your peer review form is the same as the project deadline. Failure to submit peer review form in time will cause you 5pts for each day passed deadline as a penalty. After 4 days, your peer review points will be zero. The penalty is linear interpolated. In the peer review form, there are two main parts: personal evaluation (10 pts) and technical evaluation (10 pts).
4. Github insights (20pts): We will check the commit activity for each team member and evaluate based on individual contribution to the project. The activity is not limited to source code commit. Update the documentation for project and team meeting log. The point deduction based on following rules,
    a. First, the total amount of source code and documentation is computed for the entire class and we will compute a per-person average.
    b. Second, if a student is above class average, he/she can get the full 20 pts. We will check if code and documentation are real content. Otherwise, we will deduct points.
    c. If the project demo is successful and a student may be below average in lines of code but if the amount of coding is deemed to be reasonable by TA or instructor, he/she can get the full 20pts
    d. For the rest, he/she will take the deduction based on the ratio to the class average. For example, if a student contribution 0 lines of code for both source code and documentation, he gets 0 pts in this category.
5. For in-class demo (40pts), each team demonstrate the functionality of the system. No formal presentation is required. The robot should be able to move each of joints without falling part. The robot should be able to paint.
6. Bonus point (5pt max): We will ask each robot to paint a pattern (revealed in lab demo) after teams pass the in-class demo. We compare the results in terms of speed and performance. A team gains 50 points from speed and 50 points from how well the painted pattern looks. The team with the best overall score wins the 5pts bounce points. The second best team wins 2.5 pts.