Project description: TAMU PaintBot is a PRR 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 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 centered with the brush. The diameter of the circle is 10 pixels.

Each group needs to submit a project report before the due date. The simulated robot system will be demonstrated in class. Grading is based on project report (20pts), in class demonstration (40pts), project website (20pts), and peer review (20pts). There will be a paint-job competition in class to test your PaintBot. The winning 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, please send an email to cs-csce452500-spring2016@groups.tamu.edu 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 website. Please send me your website URL via email if you have not done so. Please track the following items on your team website for grading purpose:
   a. Create sub directories for each project. You will work on five projects during the semester.
   b. Team member task allocation for current project (5pts).
   c. Team meeting log for current project (5pts).
   d. Source code for current project and instructions for compiling (5pts).
   e. Screenshot of the software interface (jpeg or png format) of the current project (5pts).

3. In your project report, I need the following (20pts):
   a. In your project report, deriving the forward kinematics model of the robot including D-H parameters and proper frame attachment for the kinematics model. I also need T matrices for each link. The project report should be in either pdf format or Google Docs and be part of your project website. (15pts)
   b. There are typos in the Handout 1. Among the 24 angle-set conventions, some of them are wrong. Please find it/them out. (5pts)

4. Peer Review (20 pts): You will be able to find a peer review form URL in our course website. You need to use your TAMU NETID to authenticate to access the Google spreadsheet to enter your review. Note that each student needs to submit his/her own form. Grading will be based on overall score that your teammates evaluate you. The deadline for turn in your peer review form is the same as the project deadline. Failure to submit peer review form before the deadline will lose 5pts as a penalty for the individual. In the peer review form, there are two main parts: personal evaluation (10 pts) and technical evaluation (10 pts).

5. For in-class demo (40pts), each team shows the functionality of the system. No formal presentation is required.