Summative Assessment 1

Advanced Robotics

General Instructions: The zip archive contains the skeleton solutions of each question, and the script *sim_robot.m* that can be used for visualization purposes as shown in the scripts *FK_test.m*. Before running the simulation, you must download and setup Peter Corke's Robotics Toolbox: `http://petercorke.com/wordpress/toolboxes/robotics-toolbox/`
Note that the Toolbox must not be used to implement the functions requested in the assignment.

Question 1: Write a MATLAB function *FK.m* to compute Forward Kinematics and geometric Jacobian for a given robot with n degrees of freedom in a certain configuration. The inputs of such function should be:

- DH parameters: n $\times$ 4 matrix which consists of DH parameters.
- joint type: n-dimensional vector which describes joint types (0 for revolute and 1 for prismatic)
- q: n-dimensional vector of joint variables specifying the robot's configuration.

The output of this function should be:

- T: the homogeneous transformation matrix from base to the end-effector
- J: the Jacobian matrix of the end-effector.

In the script *FK_test.m* write the code to display the results for at least one 2D and one 3D examples. The examples could be different either in the robot definition (DH parameters and joint types) or the robot configuration (q).