%Program2

theta1 = pi/4;

a{1,1} = 0; a{2,1} = -0.612; a{3,1} = 0.5732;

a{4,1} = 0; a{5,1} = 0; a{6,1} = 0;

d{1,1} = 0.1273; d{2,1} = 0; d{3,1} = 0;

d{4,1} = 0.163914; d{5,1} = 0.1157; d{6,1} = 0.0922;

th{1,1} = 0; th{2,1} = 0; th{3,1} = 0;

th{4,1} = 0; th{5,1} = 0; th{6,1} = 0;

alp{1,1} = pi/2; alp{2,1} = 0; alp{3,1} = 0;

alp{4,1} = pi/2; alp{5,1} = -pi/2; alp{6,1} = 0;

trvecz = [0 0 d{1,1}];

homotrvecz = trvec2tform(trvecz);

rotmz = axang2rotm([0 0 1 theta1]);

homorotmz = rotm2tform(rotmz);

trvecx = [alp{1,1} 0 0];

homotrvecx = trvec2tform(trvecx);

rotmx = axang2rotm([1 0 0 alp{1,1}]);

homorotmx = rotm2tform(rotmx);

shoulderlink = homotrvecz \* homorotmz \* homotrvecx \* homorotmx;

%Program3

robot = robotics.RigidBodyTree;

baselink = robotics.RigidBody('BaseLink');

worldjoint = robotics.Joint('WorldJoint');

worldjoint.setFixedTransform([0 0 1 pi],'dh');

baselink.Joint = worldjoint;

basename = robot.BaseName;

robot.addBody(baselink,basename);

%Program4

shoulderlink = robotics.RigidBody('ShoulderLink');

shoulderpanjoint = robotics.Joint('ShoulderPan','revolute');

shoulderpanjoint.setFixedTransform([a{1,1} alp{1,1} d{1,1} th{1,1}],'dh');

shoulderlink.Joint = shoulderpanjoint;

robot.addBody(shoulderlink,'BaseLink');

%Program5

robot.showdetails();

%Program6

upperarmlink = robotics.RigidBody('UpperArmLink');

shoulderliftjoint = robotics.Joint('ShoulderLift','revolute');

shoulderpanjoint.setFixedTransform([a{2,1} alp{2,1} d{2,1} th{2,1}],'dh');

upperarmlink.Joint = shoulderliftjoint;

robot.addBody(upperarmlink,'ShoulderLink');

forearmlink = robotics.RigidBody('ForeArmLink');

elbowjoint = robotics.Joint('Elbow','revolute');

elbowjoint.setFixedTransform([a{3,1} alp{3,1} d{3,1} th{3,1}],'dh');

forearmlink.Joint = elbowjoint;

robot.addBody(forearmlink,'UpperArmLink');

wrist1link = robotics.RigidBody('Wrist1Link');

wrist1joint = robotics.Joint('Wrist1','revolute');

wrist1joint.setFixedTransform([a{4,1} alp{4,1} d{4,1} th{4,1}],'dh');

wrist1link.Joint = wrist1joint;

robot.addBody(wrist1link,'ForeArmLink');

wrist2link = robotics.RigidBody('Wrist2Link');

wrist2joint = robotics.Joint('Wrist2','revolute');

wrist2joint.setFixedTransform([a{5,1} alp{5,1} d{5,1} th{5,1}],'dh');

wrist2link.Joint = wrist2joint;

robot.addBody(wrist2link,'Wrist1Link');

wrist3link = robotics.RigidBody('Wrist3Link');

wrist3joint = robotics.Joint('Wrist3','revolute');

wrist3joint.setFixedTransform([a{6,1} alp{6,1} d{6,1} th{6,1}],'dh');

wrist3link.Joint = wrist3joint;

robot.addBody(wrist3link,'Wrist2Link');

%Program7

eelink = robotics.RigidBody('EndEffectorLink');

eejoint = robotics.Joint('EndEffector','revolute');

eejoint.setFixedTransform([0 0 0 0],'dh');

eelink.Joint = eejoint;

robot.addBody(eelink,'Wrist3Link');

%Program8

robot.showdetails();