

SKILL ACTIVITY NO: 1 (To be filled by the Instructor)

Date : 26/08/24

Title : Draw cube of 100mm/any geometrical shape using ABBIR120 or any robot from Roboanalyzer, record and play back.

Skills / competencies to be acquired :

1. Ability to jog various Robots by using virtual robots module.
2. Ability to observe joint limits.
3. Ability to observe end effector frame & Homogenous transform.
4. Ability to draw cube of 100mm or any geometrical shape & Ability to playback.
5. Ability to operate various robots in Cartesian System.
6. Ability to record motion.

Duration of activity (hours) : 1 Hr.

(To be filled by the Student)

1. What is the purpose of this activity ? (Explain in 3 - 4 lines)

The purpose of this activity is to get familiar with the software Roboanalyzer and to understand different robot during this activity. I learned information about virtual robots.

2. Steps performed in this activity (Explain in 5 - 6 lines)

- 1) Open RoboAnalyzer.
- 2) In Roboanalyzer open virtual robot.
- 3) In virtual robot select robot ABBIR120.
- 4) After selecting robot go to the record option & start recording.
- 5) Go to cartesian control & move the robot & move cube of 100mm after making you can observe process in recording.

3. What resources / materials / equipments / tools did you use for this activity ?

1. Computer
2. Robo Analyzer software
3. Reference Books
4. _____
5. _____
6. _____
7. _____
8. _____

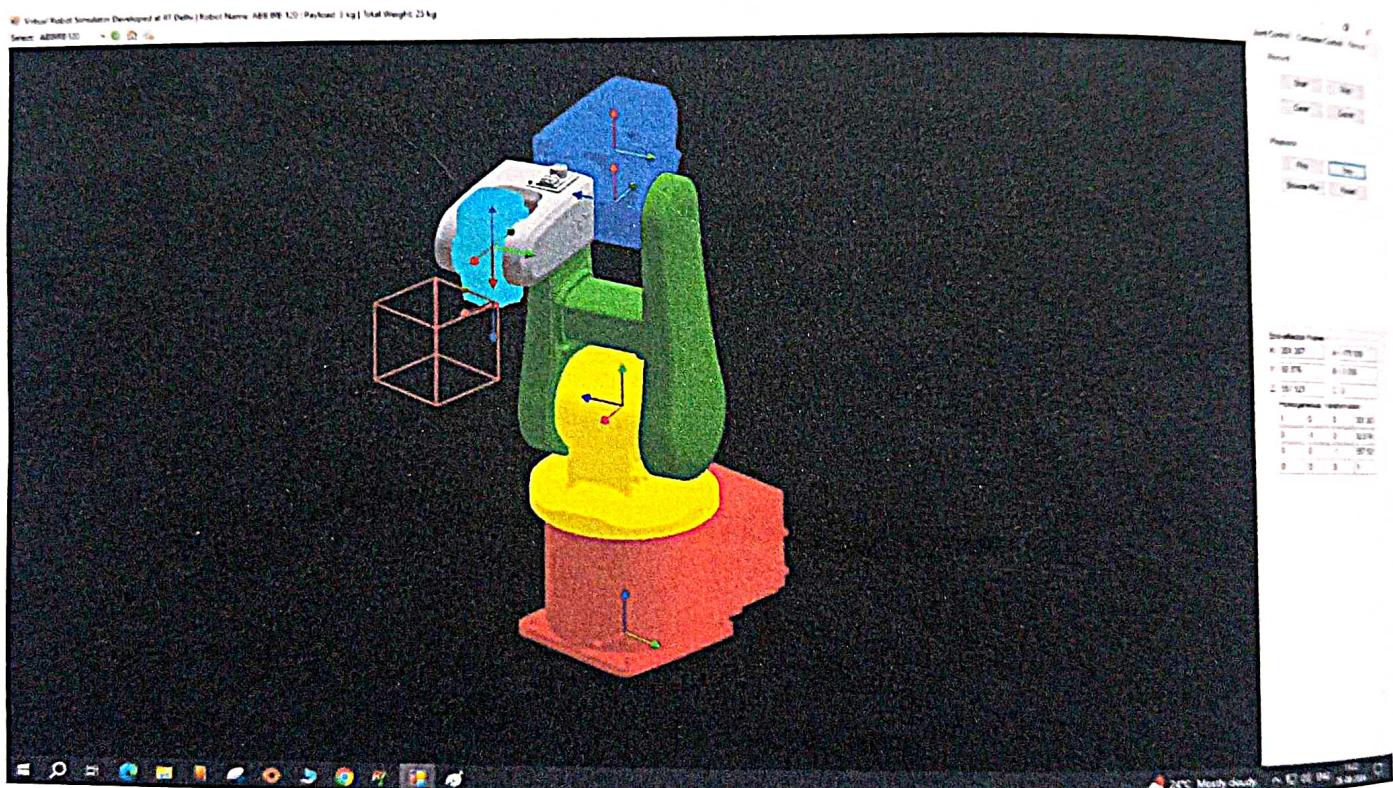
4. What skills did you acquire ?

1. Ability to store, record and playback
2. Ability to draw cube of 100mm.
3. Ability to handle Robo Analyzer.
4. Ability to control robot movements.
5. Ability to draw any shape.
6. _____
7. _____
8. _____

5. Time taken to complete the activity ? 1 (hours)

* Roboanalyzer is a 3D model based software that can be used to teach and learn the Robotics concept. It is an evolving product developed in Mechatronics lab Department of mechanical engineering at IIT Delhi.

* Virtual robot module a part of Roboanalyzer has been developed as an application which has joints & cartesian motion.



SKILL ACTIVITY NO: 2

Date : 2/09/2024

(To be filled by the Instructor)

Title : Write a program using graphic editor to pick workpiece from storage position 3 & place in storage position 1. Repeat this for 3 times. After that give out signal to channel 1 of robot.

Skills / competencies to be acquired :

1. Ability to activate mover 4 robot. 5.
2. Ability to write program using graph. B. editor.
3. Ability to control the motion of 7. robot in joint mode/cart/base mode.
4. Ability to store programs & retrieve 8. it.

Duration of activity (hours) : 1

(To be filled by the Student)

1. What is the purpose of this activity ? (Explain in 3 - 4 lines)

The purpose of this activity is to program using graphic editor to pick workpiece from storage position 3 to storage position 1. Make a loop (Repeat it 3 times).

2. Steps performed in this activity (Explain in 5 - 6 lines)

- 1) Open Roboguide CProg.
- 2) In programming Open graphic editor.
- 3) In graphic editor program the robot using linear, relative, joint, gripper, wait, Digital I/O, if-then, loop, External motion.
- 4) Program as we have to pick up workpiece from one position to another.

3. What resources / materials / equipments / tools did you use for this activity ?

1. Robot Arm - LM 9690 .
2. Drive Unit
3. Computer
4. GP Reg - software
5. Software - GP Reg → Graphic
6. Editor
7. Stationary material.
8. _____

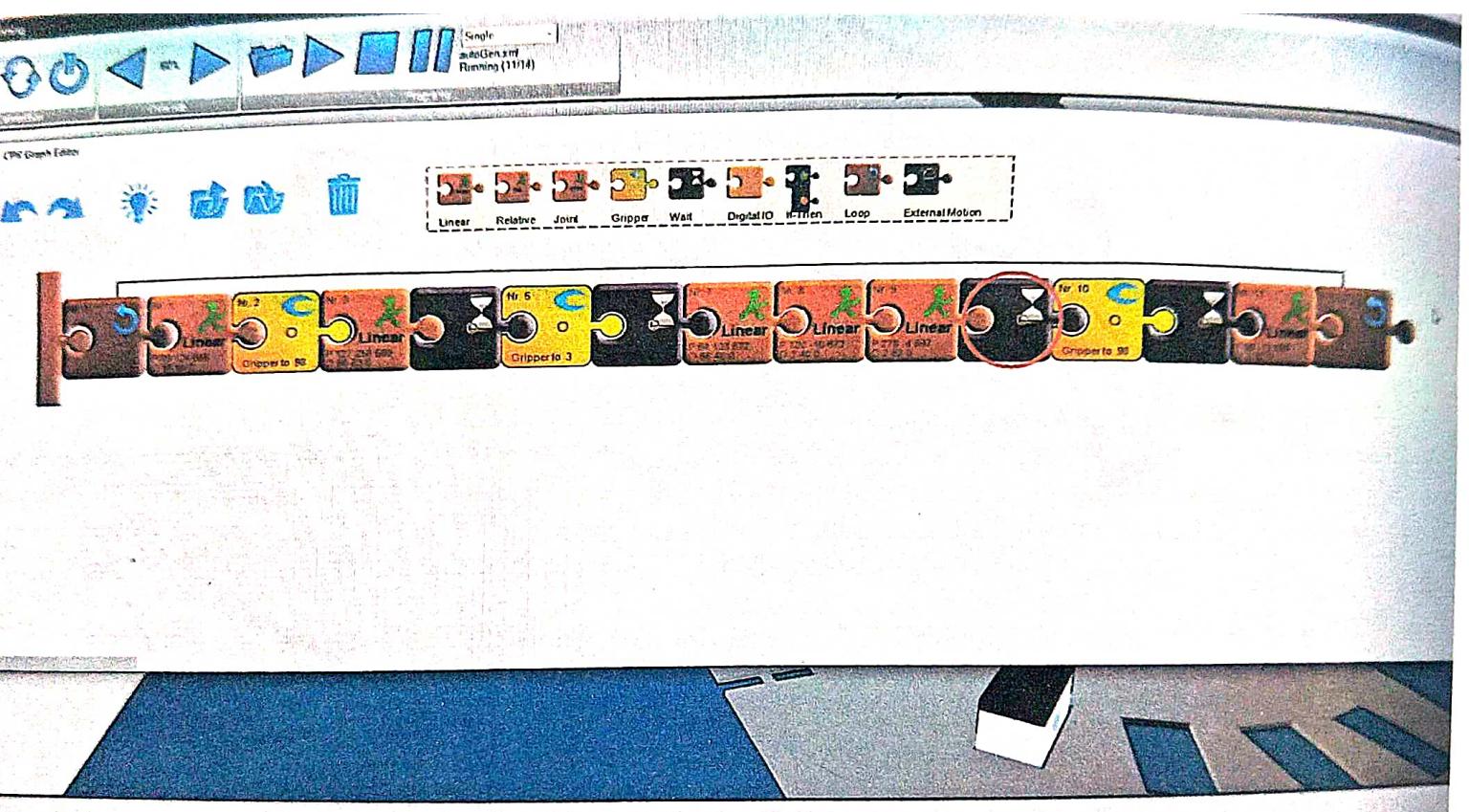
4. What skills did you acquire ?

1. Ability to activate mover 4 robot .
2. Ability to write program using graphic editor .
3. Ability to control the motion of robot in joint/ Cart /Cart base mode .
4. Ability to control the motion of robot by store program and retrieve it .
5. _____
6. _____
7. _____
8. _____

5. Time taken to complete the activity ? 1 (hours)

(Signature)


(Signature)
Student



In this skill;

I have used linear, Gripper, wait, loop to robot the arm robot.

1) Linear:- It typically means straight-line behaviour/ progression. If it's programmed in X-axis, it will move linearly, if the programmed axis is Y-axis or Z-axis. It will move linearly straight towards that axis.

2) Gripper:- Gripper is a device which is placed on end-effector.

In this, Gripper is programmed from 0 to 100.

Gripper on 98 means to open the Gripper.

Gripper on 3 or near to it means close/grip the workpiece through Gripper.

3) Wait:- Wait is used to place some delay before the work or for safety purpose.

4) Loop:- Loop is used to repeat the work.

In this we want 3 times then it will work for 3 times.

SKILL ACTIVITY NO: 3

(To be filled by the Instructor)

Date : 18/09/29

Title : Write program in graphic editor for the following operations! Robot is at position 1, when it receives signal from PLC, it moves to position 2 and resends high signal to input $I_{X0.2}$ of PLC or else to position 3 & they sends signals to input $I_{X0.3}$ of PLC.

- Skills / competencies to be acquired :
1. Ability to communicate with PLC & robot.
 2. Ability to activate Mover & robot.
 3. Ability to write program using graphic editor.
 - 4.
 - 5.
 - 6.
 - 7.
 - 8.

Duration of activity (hours) : 1

(To be filled by the Student)

1. What is the purpose of this activity ? (Explain in 3 - 4 lines)

The purpose of this activity is to move robot from position 1 to position 2 & to position 3 using PLC and its programming.

2. Steps performed in this activity (Explain in 5 - 6 lines)

- 1) Open CPRog.
- 2) In Programming open graphic editor.
- 3) Open LN → Open Automation Technology → Open the experiment.
- 4) Do the settings as per the experimental file & write PLC code in IDE.
- 5) Compile & run that code.
- 6) In graphic editor do use IF -- then, and DIO for interfacing the robot and observe the robot arm, then save the file.

3. What resources / materials / equipments / tools did you use for this activity ?

1. RoboProg Software
2. RoboProg → Graphic editor in software
3. PLC
4. PLC programming
- 5.
- 6.
- 7.
- 8.

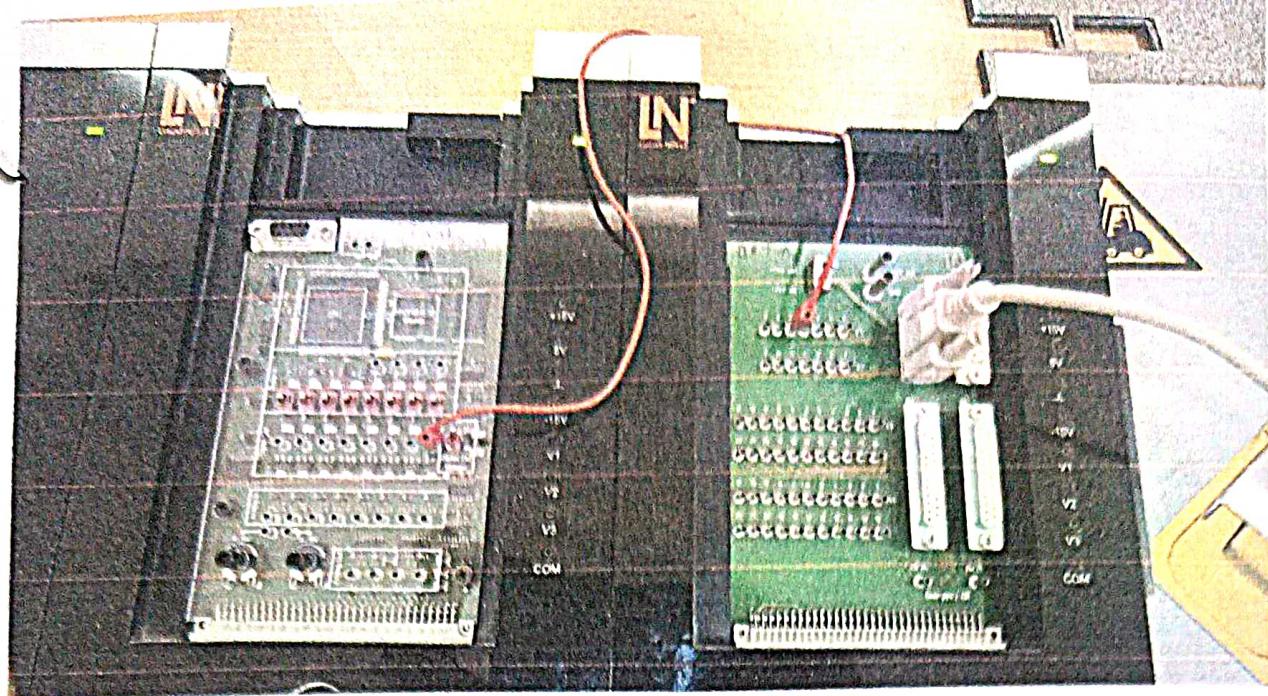
4. What skills did you acquire ?

1. Ability to communicate with PLC & robot .
2. Ability to activate Mover 4 Robot .
3. Ability to write program using graphic editor .
- 4.
- 5.
- 6.
7. graphic editor .
- 8.

5. Time taken to complete the activity ?

1

(hours)



PLC Editor

File Edit Compiler View

Control

Running

CYCLE RUN STOP RESET

24 V

Variables

Name	Value	Ch
ID	FALSE	A21
Q0	FALSE	

ams\Proj 4.xml

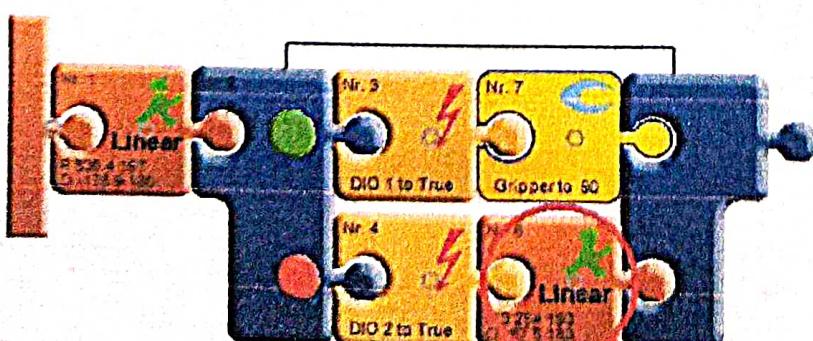
The current PLC transmits

07-008 - Licensed

70%

Graph Editor

Icons: Linear, Relative, Joint, Gripper, Wait, DigitalIO, If-Then, Loop.



SKILL ACTIVITY NO: 4

(To be filled by the Instructor)

Date : _____

Title : Simulation of manipulator and observe its motion in Roboanalyzer.

Skills / competencies to be acquired :

1. Understanding D-H parameter. 5. _____
2. Ability to animate manipulator on 6. Roboanalyzer.
3. Ability to plot position, velocity and 7. acceleration of joint.
4. _____ 8. _____

Duration of activity (hours) : _____ 1

(To be filled by the Student)

1. What is the purpose of this activity ? (Explain in 3 - 4 lines)

RoboAnalyzer provides graphical interface to visualize how robotic arm moves in 3D space, enabling a clear understanding of manipulator's motion trajectories, joint angles and workspace.

2. Steps performed in this activity (Explain in 5 - 6 lines)

- 1) Animate any 2 DOF manipulator on RoboAnalyzer.
- 2) Visualize D-H parameter for each joint.
- 3) Observe homogeneous 0T_1 , 1T_2 and 0T_3 on RoboAnalyzer.
- 4) Press on FKIN and RUN. Observe motion of each joint and end effector on Roboanalyzer.
- 5) Observe the HTM.
- 6) Press graphs and plot link position, joint acceleration and velocity.

3. What resources / materials / equipments / tools did you use for this activity ?

1. Roboanalyzer

5. _____

2. _____

6. _____

3. _____

7. _____

4. _____

8. _____

4. What skills did you acquire ?

1. Understanding D-H parameters

5. _____

2. Ability to animate manipulator

6. Roboanalyzer

3. _____

7. _____

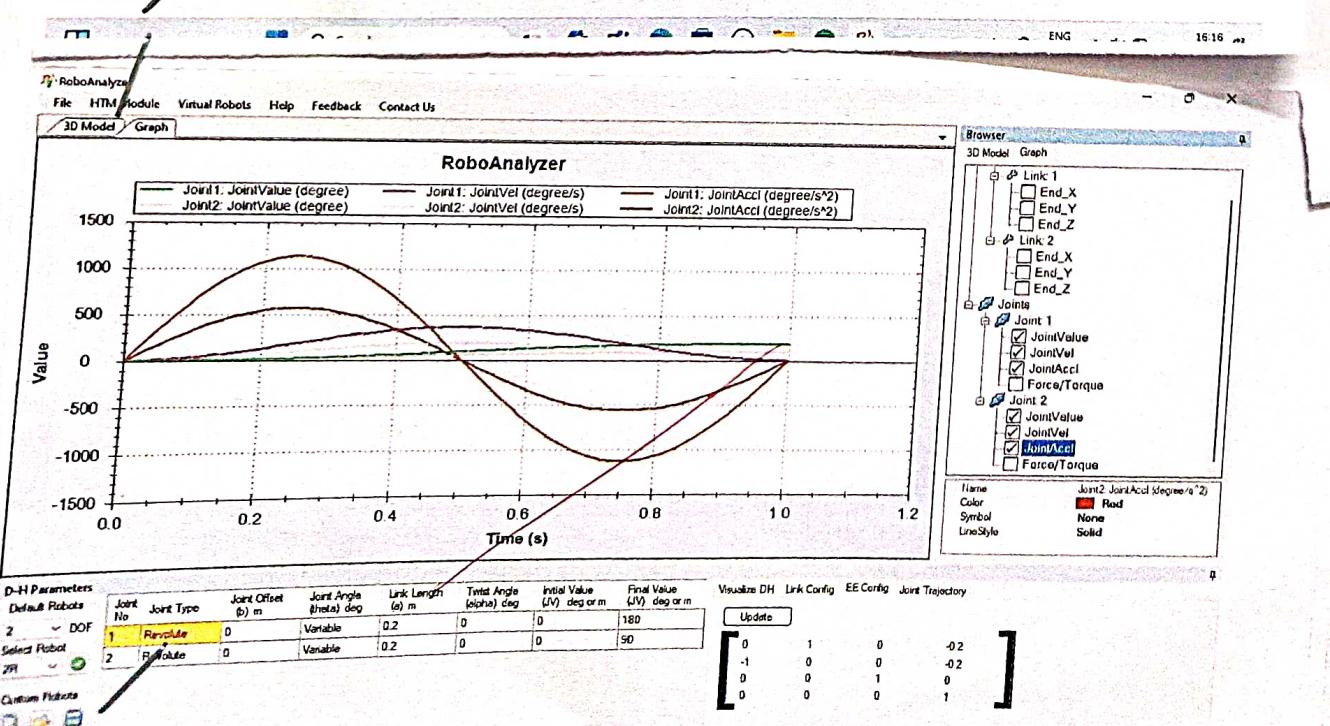
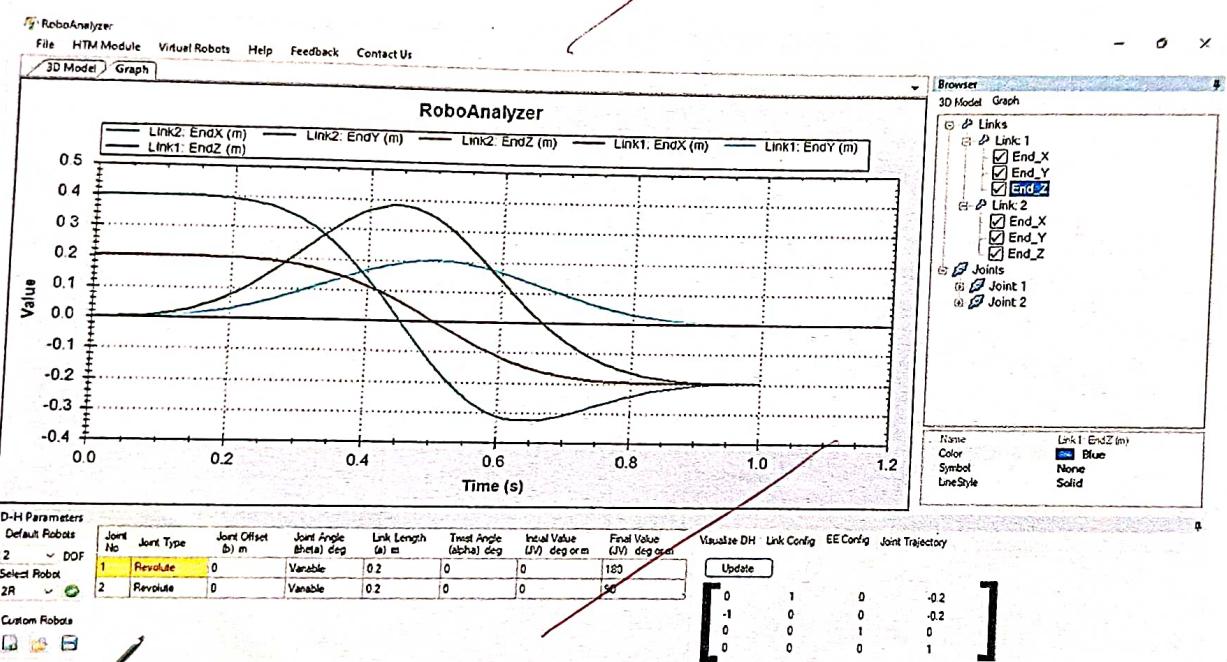
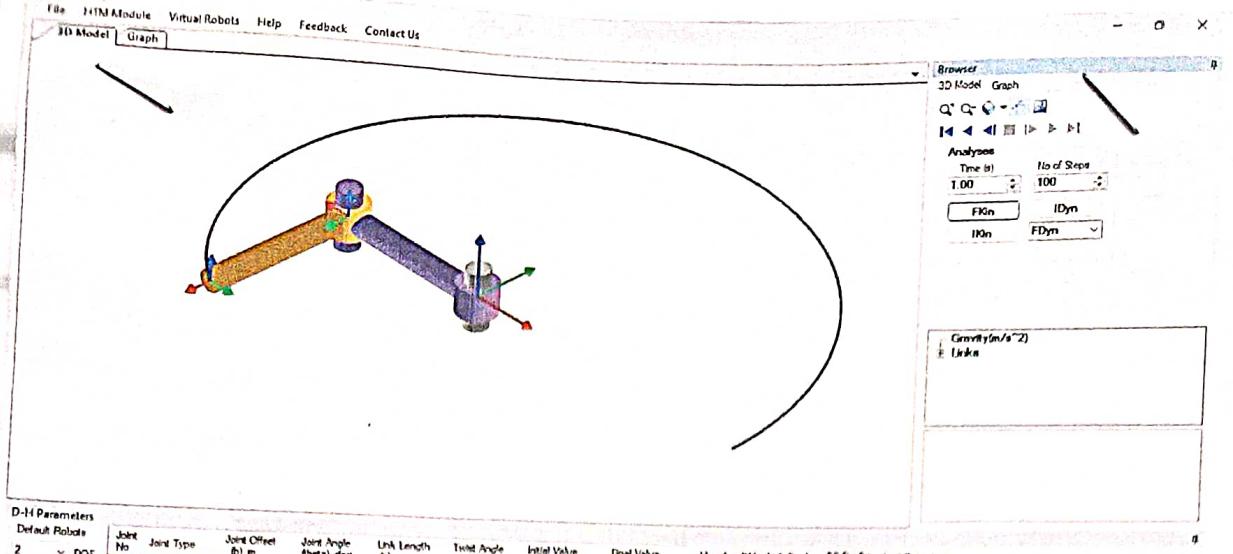
4. _____

8. _____

5. Time taken to complete the activity ?

1

(hours)



SKILL ACTIVITY NO: 5

(To be filled by the Instructor)

Date : _____

Title : Simulate any one application of robot using RoboDK.

Skills / competencies to be acquired :

1. Ability to use RoboDK Simulator for 5.
2. Various applications of Industrial 6.
3. Robot 7.
4. 8.

Duration of activity (hours) : 1

(To be filled by the Student)

1. What is the purpose of this activity ? (Explain in 3 - 4 lines)

Simulate a Pick-and-Place operation using RoboDK.

2. Steps performed in this activity (Explain in 5 - 6 lines)

- 1) Open RoboDK.
- 2) Load Robo Model.
- 3) Add Environment.
- 4) Create targets.
- 5) Set movements.
- 6) Program the gripper.
- 7) Create and run program.
- 8) Adjust and Export.

3. What resources / materials / equipments / tools did you use for this activity ?

1. RoboDK.
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

4. What skills did you acquire ?

1. Ability to use RoboDK simulator
2. for various applications of industrial
3. robot.
4. _____
5. _____
6. _____
7. _____
8. _____

5. Time taken to complete the activity ?

1

SKILL ACTIVITY NO: 6
(To be filled by the Instructor)

Date : _____

Title : Simulate mobile robot using Webots.

Skills / competencies to be acquired :

1. Ability to use Webots simulator for mobile robot.
2. _____
3. _____
4. _____
5. mobile robot.
6. _____
7. _____
8. _____

Duration of activity (hours) : 1

(To be filled by the Student)

1. What is the purpose of this activity ? (Explain in 3 - 4 lines)

Simulate any mobile robot using Webots software.

2. Steps performed in this activity (Explain in 5 - 6 lines)

- 1) Open Webots.
- 2) Add a mobile robot.
- 3) Create the environment.
- 4) Add controller.
- 5) ~~Configure sensors and Actuators.~~
- 6) Set simulation parameters.
- 7) Run simulation, Test and modify.

3. What resources / materials / equipments / tools did you use for this activity ?

1. Webots. 5. _____
2. _____ 6. _____
3. _____ 7. _____
4. _____ 8. _____

4. What skills did you acquire ?

1. Ability to use Webots simulator for various applications of mobile robot. 5. various applications of mobile
2. robot. 6. _____
3. _____ 7. _____
4. _____ 8. _____

5. Time taken to complete the activity ? 1 (hours)