PLTW Engineering **Computer Integrated Manufacturing**
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W1B: RoboCell [ER-4u] Introduction

INTRODUCTION

Software installation if using your personal computer. Please email me for the license code.
https://s3.amazonaws.com/support-downloads.pltw.org/Software+Page/RoboCell/Robocell.pdf

EQUIPMENT

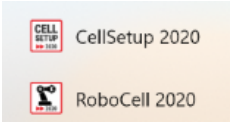
RoboCell Software

- **YouTube Video Resource:**
- https://www.youtube.com/watch?v=p3_Wc-bvWEs&list=PLJuwb3xnlvclFigEg127kl_0baNgBkWjG&ab_channel=Chris%26JimCIM

RoboCell Notes

Use the YouTube Tutorial to help you understand the steps for CellSetup 2020 and RoboCell 2020. Bullet points are required for each of the steps. Steps must explain what buttons need to be pressed and what operation they perform. All notes for this section are typed. You may use screenshots but must still summarize the information.

Tutorial 1: RoboCell Basics	**Tutorial 2: Robocell: Setting Up Your Cell in CellSetup**
https://www.youtube.com/watch?v=p3_Wc-bvWEs&list=PLJuwb3xnlvclFigEg127kl_0baNgBkWjG&ab_channel=Chris%26JimCIM	https://www.youtube.com/watch?v=5FqJT40LPhA&list=PLJuwb3xnlvclFigEg127kl_0baNgBkWjG&index=2&ab_channel=Chris%26JimCIM



DETAILED NOTES: What are the steps you need to do to set up the software?

RoboCell 2020

1. What is the first step of getting started using RoboCell 2020? Explain each step and what buttons to press. Read the instructions above.

The very first step is to build the cell itself using a separate program called CellSetup.

Specific steps and buttons:

1. Open the Cell Setup program.
2. Go to File in the menu and select New.

3. A window will pop up asking you to select a robot. For these activities, you will choose the ER 4u robot.
4. After selecting the robot, you add it to the cell, for example, by choosing No Slide Base and clicking OK. The robot will then be placed on the factory floor.

2. Why must to create a Folder called Last Name RoboCell 2020 [Ex: Guzman RoboCell 2020] and Folders A-H inside your main folder? Why must you save the work in the correct folder?

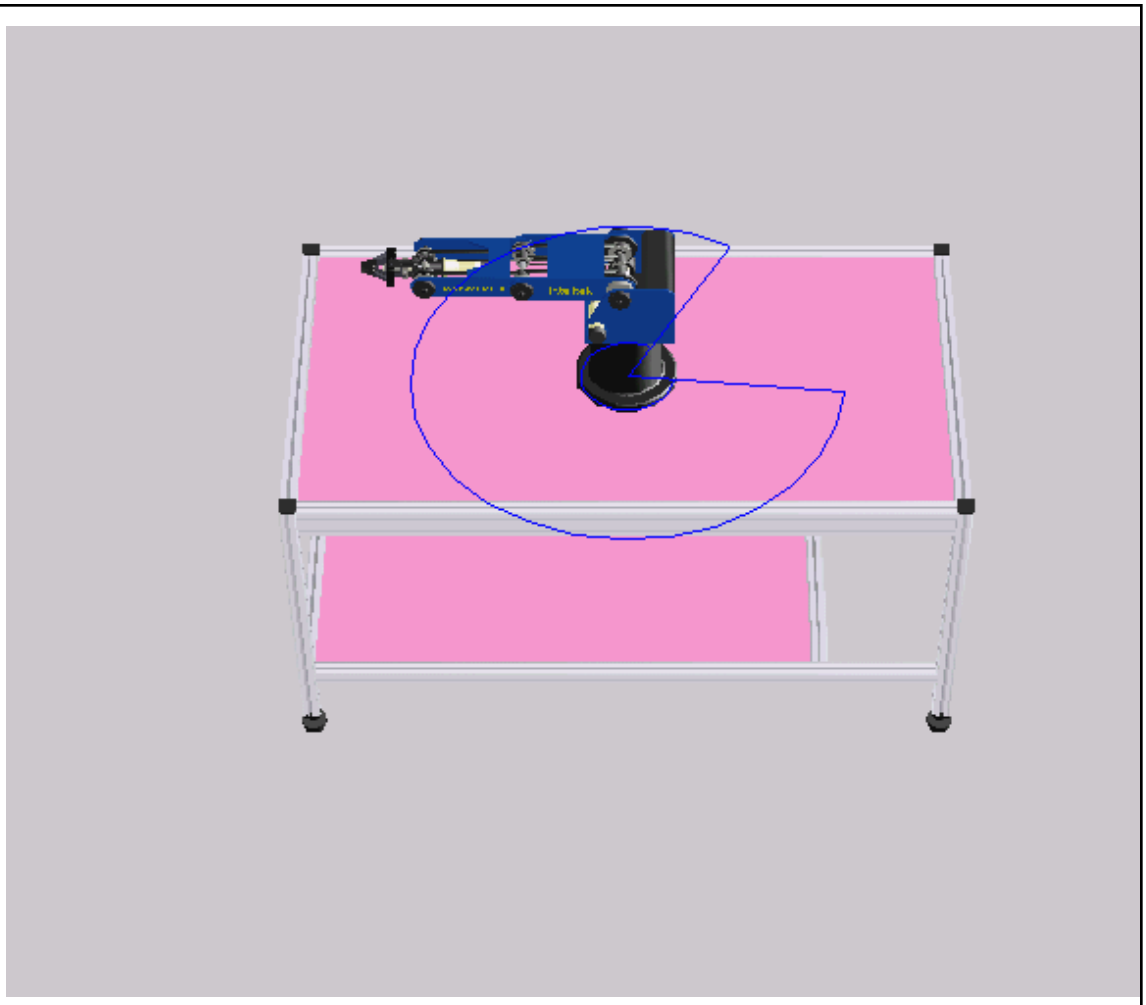
You must create a main folder with subfolders for organization and to prevent your programs from breaking. The folders A-H correspond to the Project Lead The Way activities, making it easy to find your work. When you save a project in RoboCell, it saves four different files for that single program. All four files must stay together in the same folder. If you move or delete even one of those files, the program will become corrupted and will not work later on.

3. What is the RoboCell Workflow?
https://www.youtube.com/watch?v=wm4YzrNthYY&list=PLJuwb3xnlvclFigEg127kl_0baNgBkWjG&index=3&ab_channel=Chris%26JimCIM

The RoboCell workflow, or order of operations, consists of the following steps:
1. Make the cell in CellSetup.
2. Start a new project in RoboCell.
3. Import the 3D model.
4. Record and teach the points.
5. Write the program.

CellSetup 2020

1. **Why must you NOT rotate your robot arm?**
You must not rotate the robot arm when you first place it in CellSetup because it will mess up your X, Y, and Z axes. The base of the robot is intended to be the 0,0,0 origin point for the entire cell, and rotating it will make programming positions much more difficult.
2. What is a work envelope? Take a screenshot of where you can verify this information.
A work envelope is a visual representation, shown as a blue line or wireframe, that displays the maximum reach of the robot arm in all directions. If an object is inside this envelope, the robot can likely get to it.



3. Where do you go to insert objects into your work cell?
   You insert objects using the "New Objects" window. This window contains folders for different types of objects.
4. What button do you press when you lose your object screen?
   If you accidentally close the "New Objects" window, you can get it back by clicking the "New Object" icon on the toolbar.
5. What button do you press to see the Cartesian Coordinate System for all the objects on your workcell (workspace)?
   To see the X, Y, and Z positions (Cartesian coordinates) of all the objects in your cell, you click the "Show Positions" button on the toolbar.
6. Provide a screenshot and insert it in a Google Drawing to label where the X and Y axes are located on this CellSetup 2020.

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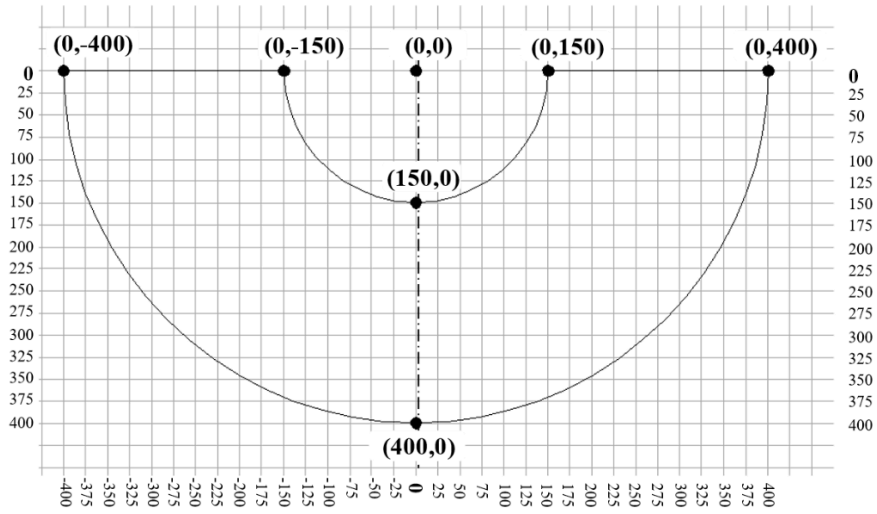
Activity 3.1.2e Work Envelope Paper



Conclusion

In a few sentences answer the questions below.

1. What did you learn about the Cartesian Coordinates on a Robotic Arm?
   I learned that the robot's base acts as the 0,0,0 origin, and it's critical to not rotate the robot, or it will "mess up" the X, Y, and Z axes. Additionally, in this specific software, the X and Y axes are "flipped" compared to a standard coordinate system.

2. Why is it important to understand the order of operations on the RoboCell ER-4u?
   It's important because it is the required workflow to create a functional simulation. You must follow the steps in order—build the cell, import the model, teach the points, and then write the program—as each step builds upon the previous one.