

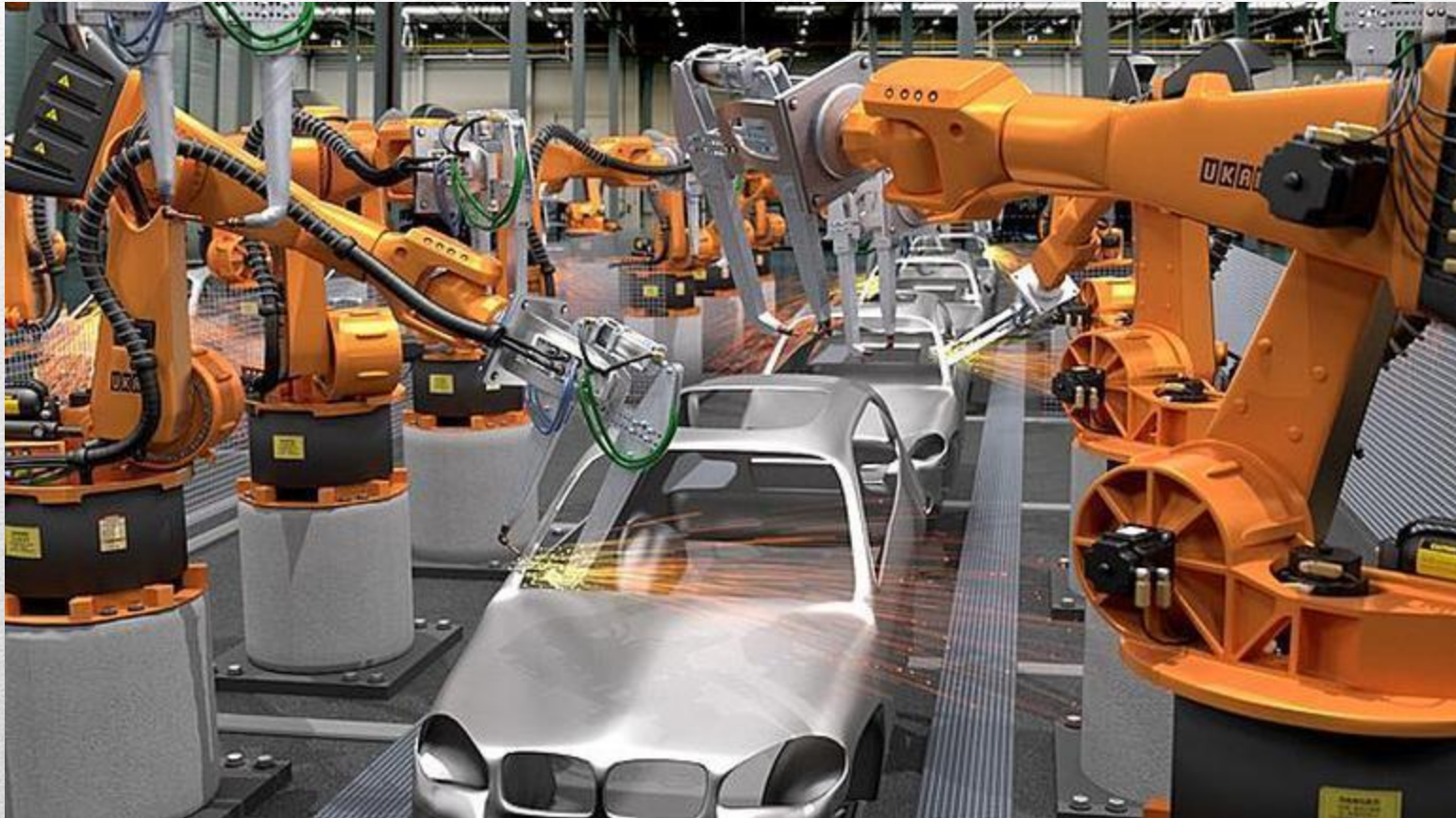
Design and Development of a Competitive Low-Cost Robotic Arm

A Presentation by David Togonidze and Mirian Bezhitadze

Why Do We Need Robots?

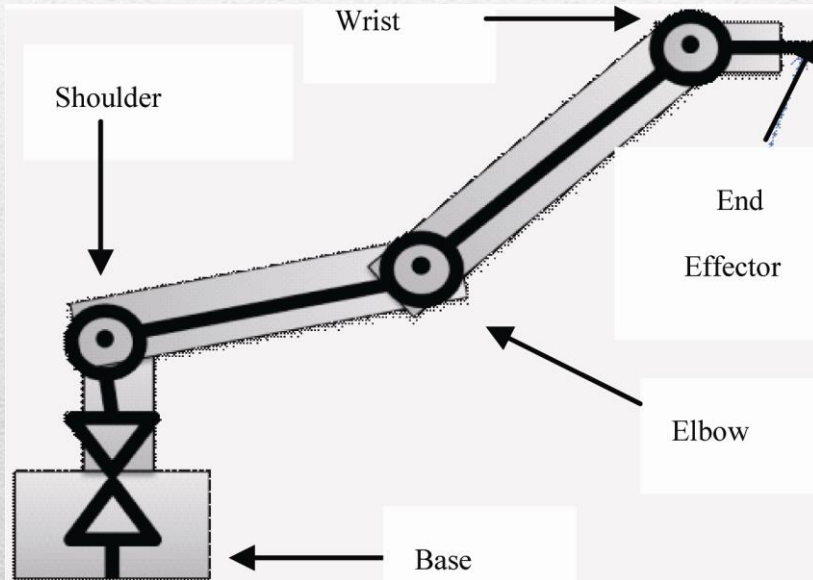
- Human Safety
- Economical Growth → Bigger Market → More Product → More Work Required
- Precision

Industrial Robots

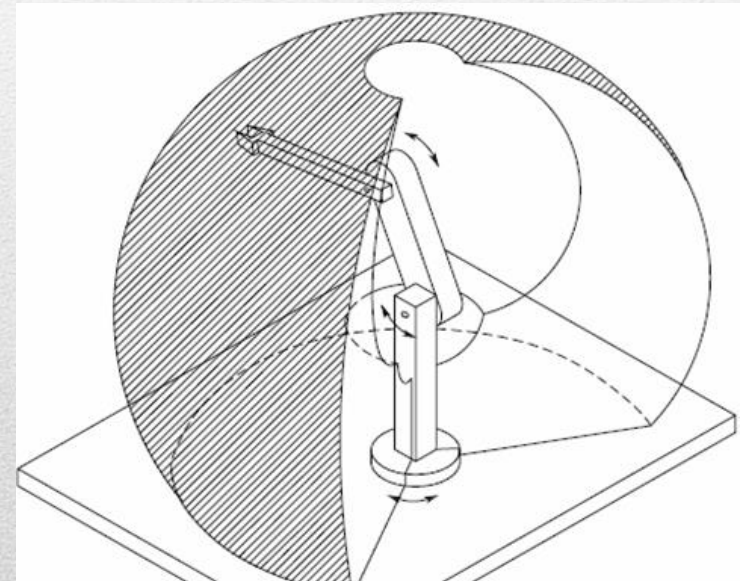


Mechanical Design

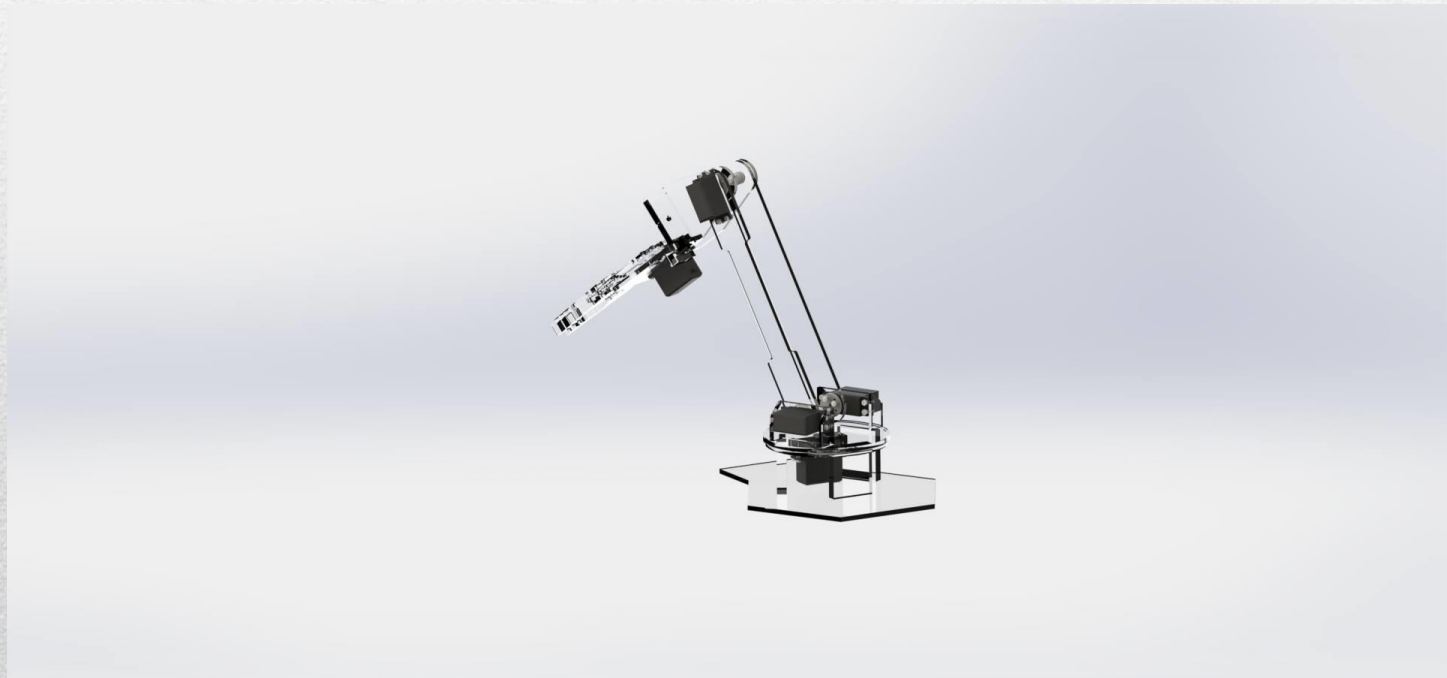
Free Body Diagram



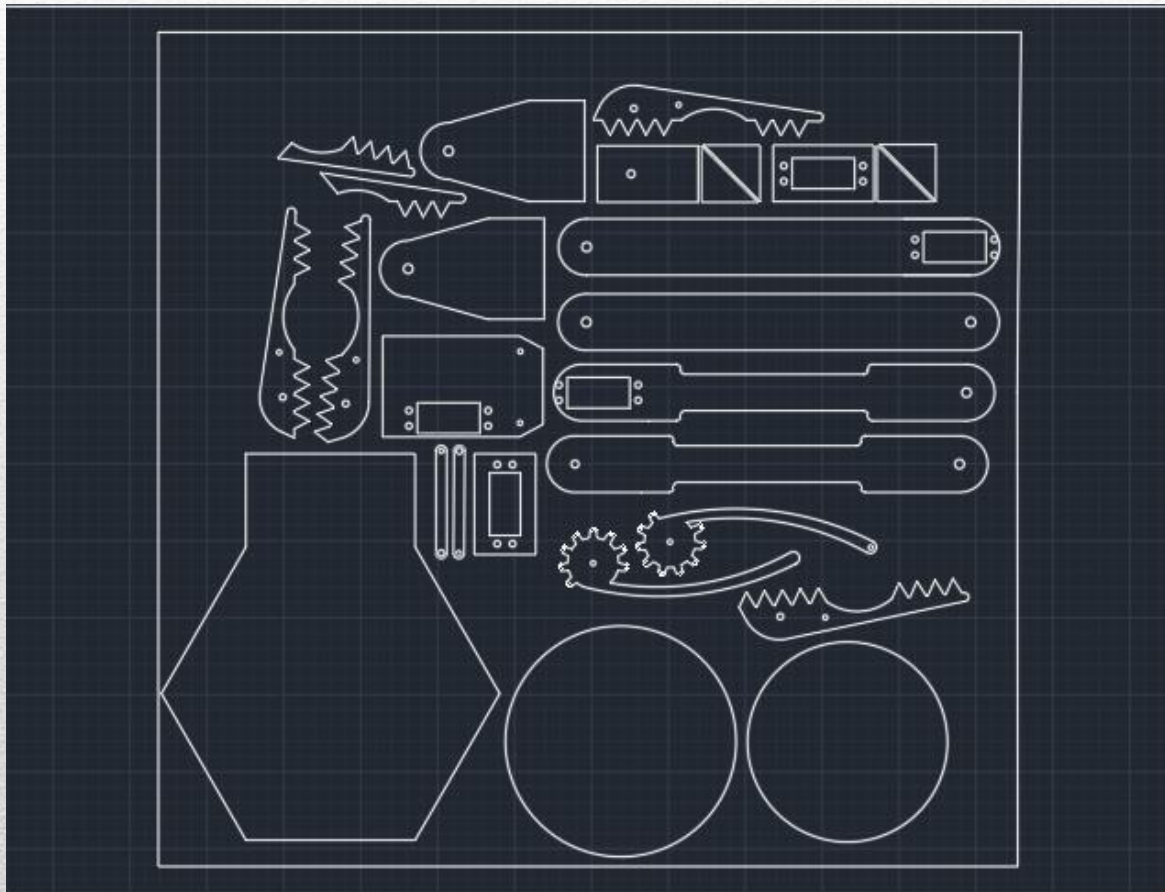
Work Region of Robotic Arm



SolidWorks 3D Model

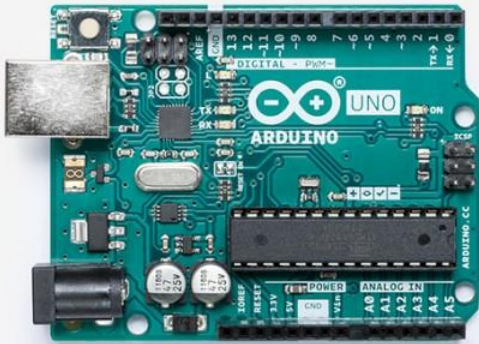


Mechanical Design



Autocad Drawing for
Numerical Control

Key Components



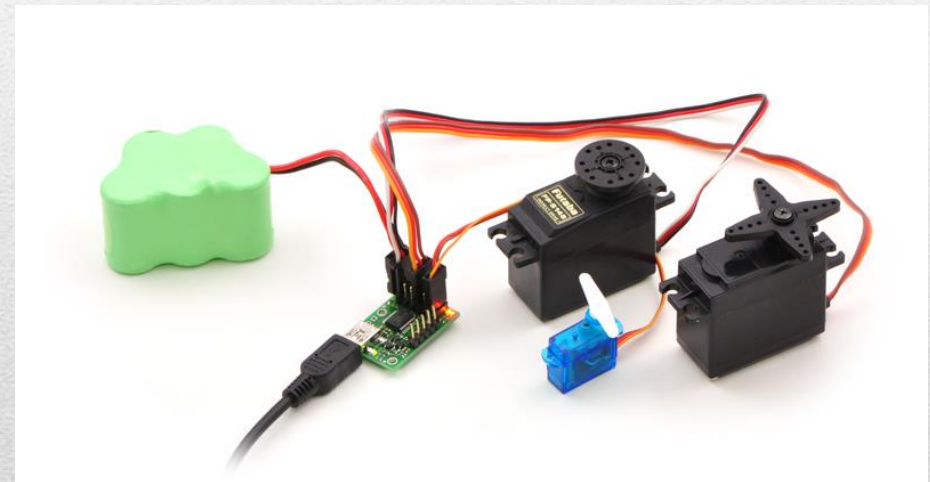
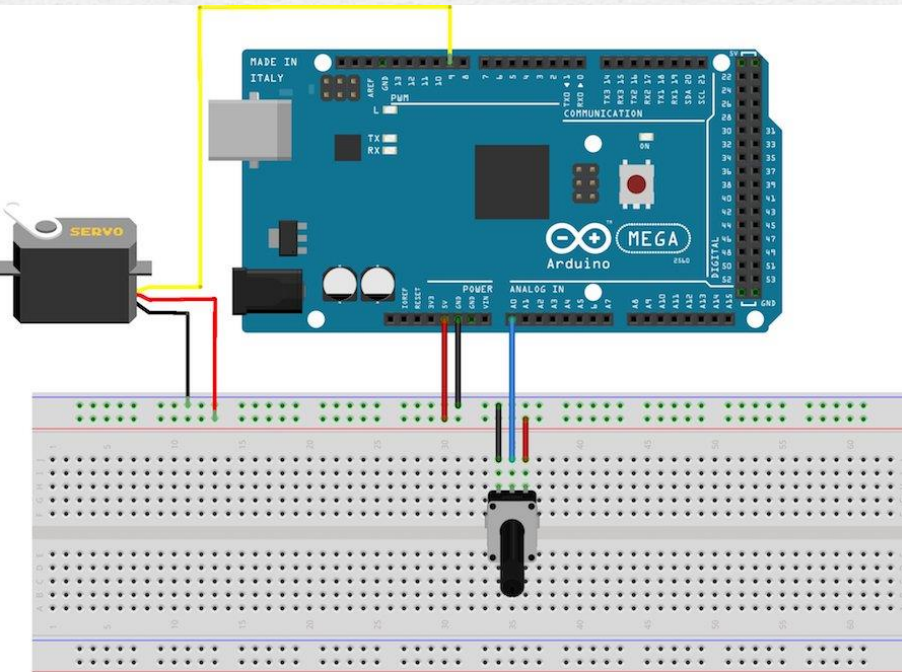
- Arduino uno
- Towerpro MG 995
- Maestro Servo Controller
- Acrylic Glass



Robotic Arm Control

Arduino uno Control

Servo Controller



Servo Controller Environment

The screenshot displays a software interface for a servo controller. At the top, there is a menu bar with 'File', 'Device', 'Edit', and 'Help'. Below the menu bar, the connection status is shown as 'Connected to: #00000101' and 'Firmware version: 1.00'. The error code is '0x0000'. The interface has several tabs: 'Status', 'Errors', 'Channel Settings', 'Serial Settings', 'Sequence', and 'Script'. The 'Status' tab is active, showing a table of channels with their respective settings and visual feedback.

#	Name	Mode	Enabled	Target	Speed	Acceleration	Position
0	Left arm A	Servo	<input checked="" type="checkbox"/>	1496.00	76	9	1496.00
1	Left arm B	Servo	<input checked="" type="checkbox"/>	1084.75	5	0	1629.50
2	Left arm C	Servo	<input checked="" type="checkbox"/>	2203.00	0	0	2203.00
3	Right arm A	Servo	<input checked="" type="checkbox"/>	1496.00	76	9	1496.00
4	Right arm B	Servo	<input checked="" type="checkbox"/>	1652.50	5	0	1321.75
5	Right arm C	Servo	<input checked="" type="checkbox"/>	2203.00	0	0	2203.00
6	Neck	Servo	<input checked="" type="checkbox"/>	1141.25	120	13	1141.25
7		Servo	<input type="checkbox"/>	1500.00	0	0	0.00
8	PWM Output	Output	<input type="checkbox"/>	1500.00	0	0	0.00
9	Button	Input	<input checked="" type="checkbox"/>	255.75	0	0	255.75
10	Sensor	Input	<input checked="" type="checkbox"/>	52.50	0	0	52.50
11	Digital output	Output	<input type="checkbox"/>	2000.00	0	0	0.00

Software





Testing and Validation

- Error Management
- Filtering signals
- Hardware Issues
- Servo Reliability
- Code Bugs



Thank you