



# Lynbrook Robotics

the funky monkeys

CAD Assemblies



Lynbrook Robotics  
the funky monkeys

# Overview

1. Get familiar with Inventor view screen
2. Know the CAD terminology
3. Make a basic drivetrain!



Lynbrook Robotics  
the funky monkeys

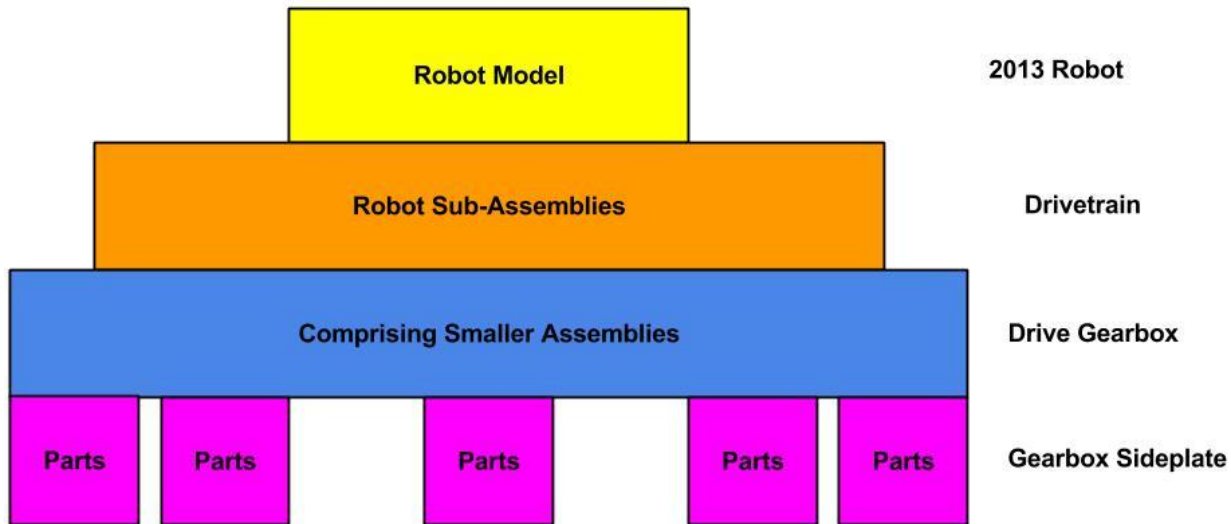
# Terminology

1. What are parts and assemblies?
  - a. Parts are 3D models that only consist of *one file* ; They are *basic units*
  - b. Assemblies are 3D models that consist of multiple parts/assemblies put together ; They are *complex units*
2. What is the hierarchy?
  - a. Parts put together make assemblies
  - b. Assemblies put together can make larger assemblies



Lynbrook Robotics  
the funky monkeys

# Robot Hierarchy





Lynbrook Robotics  
the funky monkeys

# Open Inventor

- Click on the Inventor Icon to launch Inventor 2014
- This will take some time...



Lynbrook Robotics  
the funky monkeys

# Open Main Assembly

- Click on the “Open” in the “Launch” toolbar
- Browse to the extracted .zip file and open “Drivetrain\_Assembly.iam”



Lynbrook Robotics  
the funky monkeys

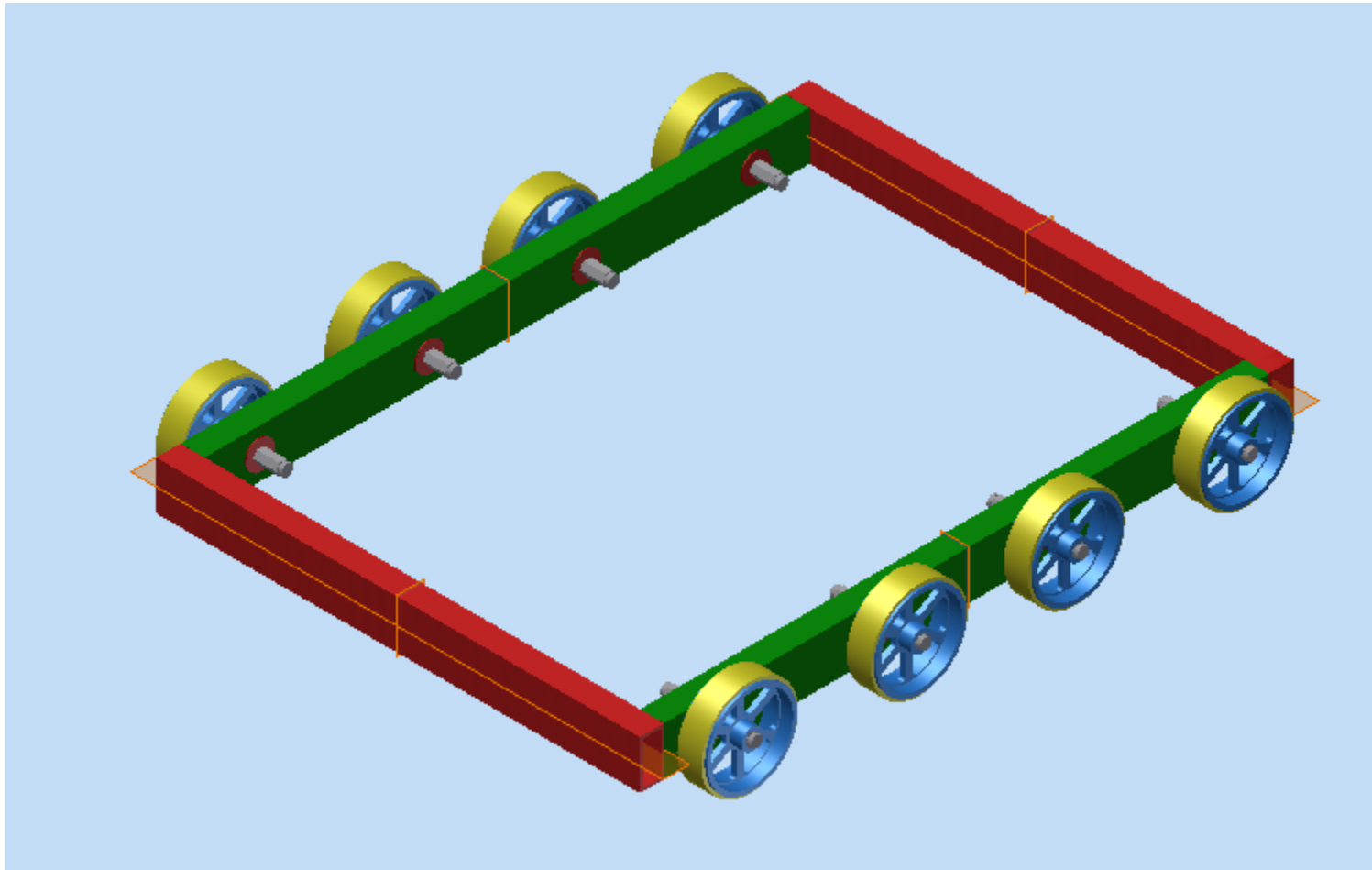
# Change Background

- Change Background to “Sky Blue”:
  - Click on “Tools” then “Application Options” then “Colors”
  - Select Sky
  - Click on the drop-down box and click 1 color



Lynbrook Robotics  
the funky monkeys

# Drivetrain\_Assembly







Lynbrook Robotics  
the funky monkeys

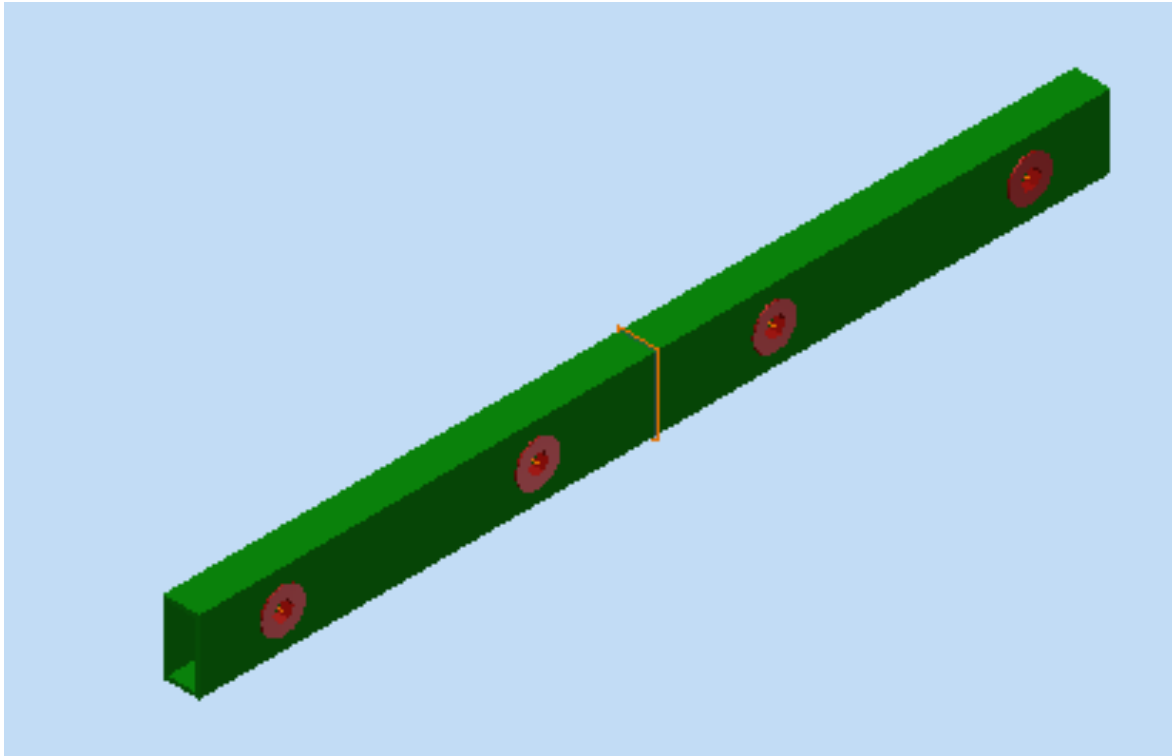
# Open Sub-Assembly

- Click on the “I” in the top left and click “Open”
- Browse to the folder and click on “Frame\_Assembly.iam”



Lynbrook Robotics  
the funky monkeys

# Frame\_Assembly





Lynbrook Robotics  
the funky monkeys

# Make an Assembly

- Click on the "I" and select the arrow next to "New" and then "Assembly"
- Click "Place"
- Place one instance of "Frame\_Member.ipt"
- Right-click and select "Grounded"
- Click "Place"
- Place one instance of "hex\_bearing.ipt"
- Save as "Frame\_Assembly\_(YourName).iam"



Lynbrook Robotics  
the funky monkeys

# Constraints

- Hold together different parts in specific ways in assemblies
- Mate
- Flush
- Insert
- Co-axial



Lynbrook Robotics  
the funky monkeys

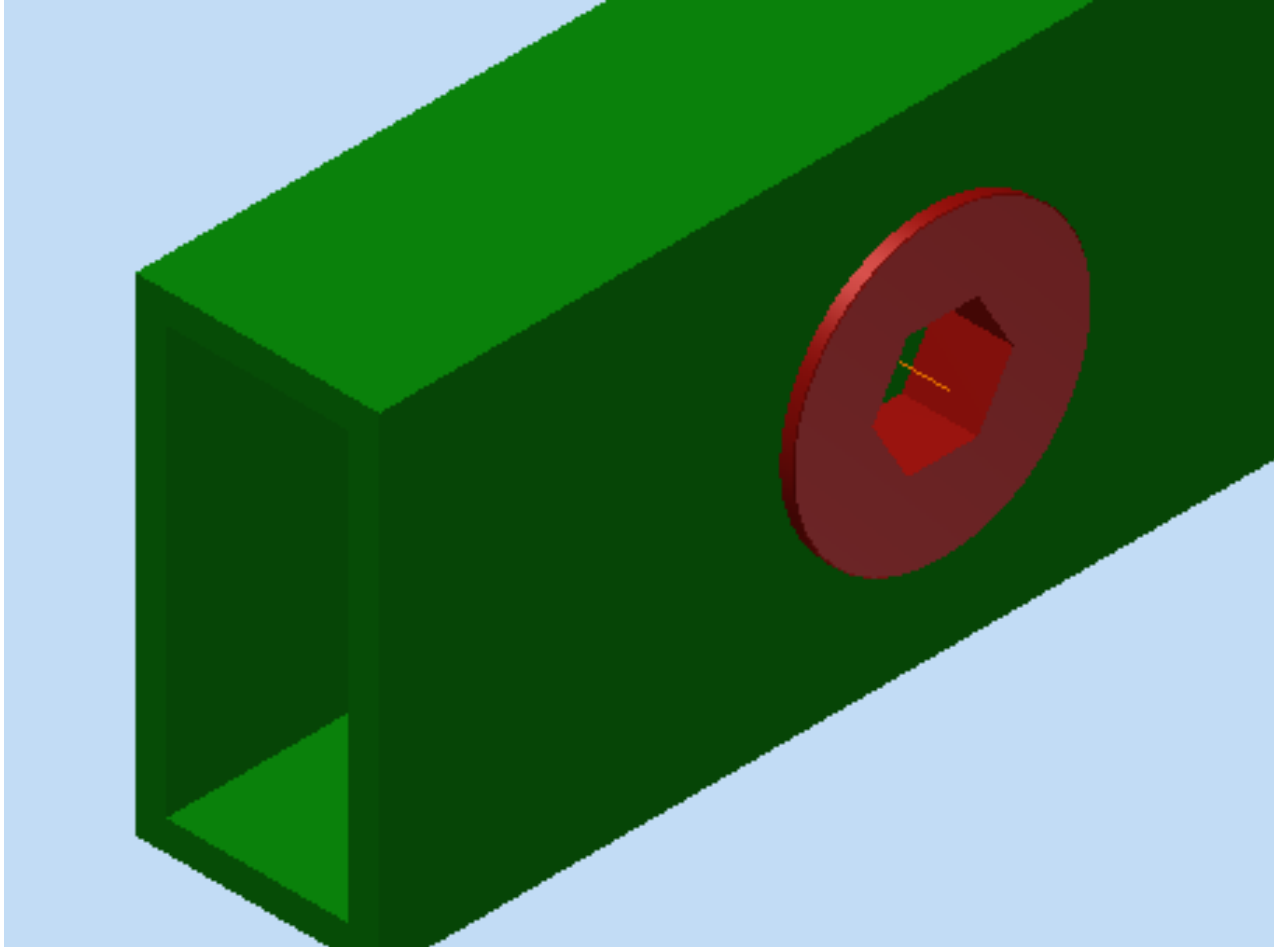
# Insert

- Inserts a cylindrical object, such as a bearing into a hole of appropriate width
- Insert the inside of the bearing flange into the bearing hole
- Click on “Constrain” under “Relationships” bar



Lynbrook Robotics  
the funky monkeys

# Insert the Bearing





Lynbrook Robotics  
the funky monkeys

# Repeat!

Repeat with 7 more instances of  
"hex\_bearing.ipt"



Lynbrook Robotics  
the funky monkeys

# Main Assembly

- Create a New Assembly
- Place one instance of your Frame Assembly and select "Grounded"
- Place another instance of the same assembly, but leave it ungrounded
  
- Place two instances of "Frame\_Member2.ipt"
- Save as "Drivetrain\_Assembly\_(YourName).iam"





Lynbrook Robotics  
the funky monkeys

# Mate and Flush

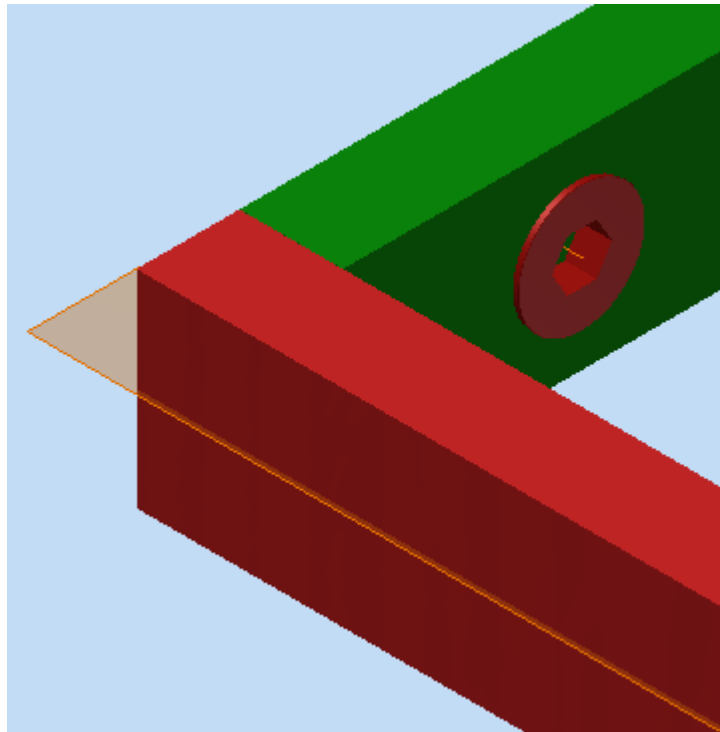
- Mate is used to stick two surfaces together
- Flush is used to make two surfaces lie on one plane
- Click on “Constrain” under “Relationships” bar



Lynbrook Robotics  
the funky monkeys

# Constraining Parts

- Mate Faces together to form right-angle parts





Lynbrook Robotics  
the funky monkeys

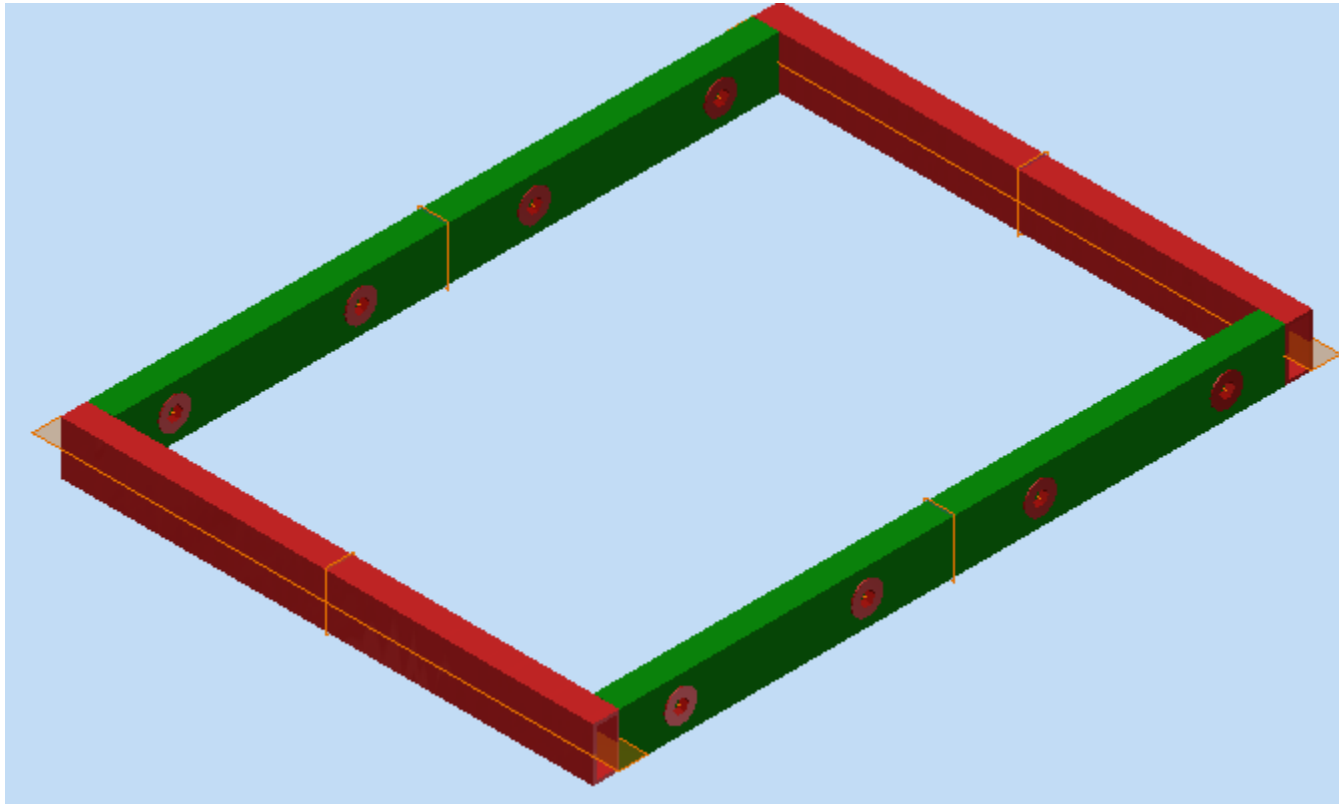
# Finish Frame

- Make Rectangular Frame with Red on opposite sides and Green on opposite sides



Lynbrook Robotics  
the funky monkeys

# Frame Base





Lynbrook Robotics  
the funky monkeys

# Add Wheels

- Place 8 instances of “WheelAssembly.iam”
- Constrain axis of Wheel Shaft to axis of Bearing
- Mate one face of hex on shaft to one face of hex on bearing



Lynbrook Robotics  
the funky monkeys

# Offsets

- Mate the Face of the Bearing to the Inner Face of the Wheel

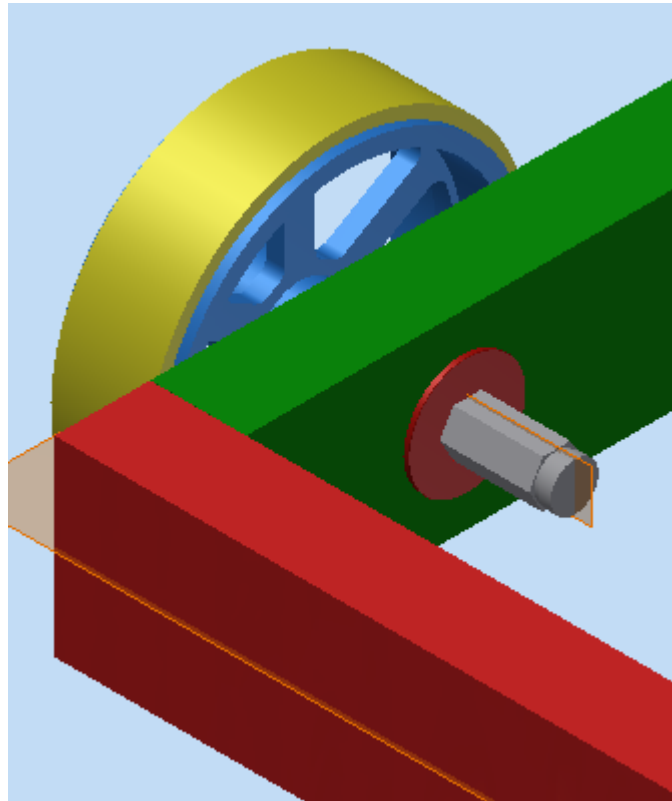
**BUT**

- Type in an offset of 0.125 in the box
- Repeat for 8 other wheel assemblies



Lynbrook Robotics  
the funky monkeys

# Wheel Inserted





Lynbrook Robotics  
the funky monkeys

# You're Done

## CONGRATULATIONS!