1) Install ROS Packages

```
cd ~

sudo apt-get install ros-indigo-ros-control ros-indigo-gazebo-ros-control ros-indigo-joint-state-controller ros-indi

mkdir -p ~/Projects/chessbot/src

cd ~/Projects/chessbot/src
```

Note: Since the textbook was written, the r2 simulator has been deprecated. The paths below have been updated.

```
git clone -b indigo https://bitbucket.org/nasa_ros_pkg/deprecated_nasa_r2_simulator.git

git clone -b indigo https://bitbucket.org/nasa_ros_pkg/deprecated_nasa_r2_common.git
```

We really need the original directory names:

```
cd ~/Projects/chessbot/src
mv deprecated_nasa_r2_simulator nasa_r2_simulator
mv deprecated_nasa_r2_common nasa_r2_common
```

Now compile the code:

```
cd ..
catkin_make
```

More Installation:

```
sudo apt-get install python-pip
sudo pip install pgnparser
```

GET CODE FROM SLACK

- Download "chessbot_scripts.zip" from Slack.
- Transfer this archive to your VM.
- Extract the contents into ~/Projects/chessbot/src/.
  - Make sure that ~/Projects/chessbot/src/scripts exists.

2) [Terminal 1] Start the R2 in Gazebo:

```
cd ~/Projects/chessbot
source devel/setup.bash
roslaunch r2_gazebo r2_gazebo.launch
```

3) [Terminal 2] Compute Forward Kinematics:

```
rosrun robot_state_publisher robot_state_publisher
```

4) [Terminal 3] Start Moveit:

```
cd ~/Projects/chessbot
source devel/setup.bash
roslaunch r2_moveit_config move_group.launch
```

5) [Terminal 4] Run the Mime:

Random:

```
cd ~/Projects/chessbot/src/scripts
chmod +x r2_mime.py
./r2_mime.py
```

Or command line interface (CLI):

```
cd ~/Projects/chessbot/src/scripts
chmod +x r2_cli.py
./r2_cli.py left 0.5 -0.5 1.3 3.14 -1.5 -1.57
./r2_cli.py right -0.4 -0.6 1.4 3.14 -1.5 -1.57
./r2_cli.py left 0.4 -0.4 1.2 3.14 -1.5 -1.57
```

Or, shortcuts to the CLI using a .bash script:

```
cd ~/Projects/chessbot/src/scripts
source ./r2.bash
r2lhome
r2rhome
r2home
```

MOVING R2's HAND

1) [Terminal 4] Move the hand to a location on the chessboard:

```
cd ~/Projects/chessbot/src/scripts
chmod +x r2_chessboard_cli.py
./r2_chessboard_cli.py a2 0.04
```

2) [Terminal 4] Hand pinch:

```
cd ~/Projects/chessbot/scripts
chmod +x r2_hand.py
./r2_hand.py pre-pinch
```

```
./r2_hand.py pinch
```

PLAYING CHESS

1) [Terminal 1] Start the R2 in Gazebo:

```
cd ~/Projects/chessbot
source devel/setup.bash
roslaunch r2_gazebo r2_gazebo.launch
```

2) [Terminal 2] Compute Forward Kinematics:

```
rosrun robot_state_publisher robot_state_publisher
```

3) [Terminal 3] Start Moveit:

```
cd ~/Projects/chessbot
source devel/setup.bash
roslaunch r2_moveit_config move_group.launch
```

4) [Terminal 4] Spawn (and reset) the chessboard:

```
cd ~/Projects/chessbot/scripts
chmod +x spawn_chessboard.py
./spawn_chessboard.py
```

5) [Terminal 5] Playback a chess match:

```
cd ~/Projects/chessbot/scripts
chmod +x r2_chess_pgn.py

source ~/Projects/chessbot/devel/setup.bash
./r2_chess_pgn.py morgan_defeated.pgn
./r2_chess_pgn.py morgan_defeated_lan.pgn
```