MultiRobot Experiments – Setup Testing

4DM70 – ANALYSIS AND DESIGN OF NETWORKED DYNAMICAL SYSTEMS

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Network: **CoreMobileWiFi**
Password: **core_mobile-123!**

Step 1 – Connect to “CoreMobileWiFi” Network

- Connect to the “CoreMobileWiFi” network (*Password:* core_mobile-123!)
- Check your IP address (e.g., **ipconfig** on *Command Prompt*): 192.168.6.???

```
Wireless LAN adapter Wi-Fi:
   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::d177:242f:dbb4:5241%16
   IPv4 Address. . . . . . . . . . . : 192.168.6.???
   Subnet Mask . . . . . . . . . . . : 255.255.0.0
   Default Gateway . . . . . . . . . : 192.168.0.1
```

- Check your connectivity with the external simulation computer (e.g., run a **ping** network test)

```
$ ping 192.168.4.104
Pinging 192.168.4.104 with 32 bytes of data:
Reply from 192.168.4.104: bytes=32 time=66ms TTL=64
Reply from 192.168.4.104: bytes=32 time=78ms TTL=64
Reply from 192.168.4.104: bytes=32 time=90ms TTL=64
```

Step 2 – Start MATLAB and check ROS and Aerospace Toolboxes

- Start MATLAB (e.g., **matlab** on Windows Command Prompt)
- Run **help ros2** on MATLAB Command Window

```
>>  help ros2
   ros2 Retrieve information about ROS 2 network

   TOPICLIST = ros2("topic","list") lists topic names that are currently
   registered on ROS 2 network through either publishers or subscribers.
   Simplified form:
   ros2 topic list
```

- Run **help quat2angle** on MATLAB Command Window

```
>>  help quat2angle
   quat2angle Convert quaternion to rotation angles.
   [R1, R2, R3] = quat2angle(Q) calculates the calculates the set of
   rotation angles, R1, R2, R3, for a given quaternion, Q = [w, x, y, z].
```

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Step 3 – MATLAB ROS Topic List Demo

- Set **ROS_DOMAIN_ID** in the MATLAB Command Window

```
%%% PLEASE MAKE SURE YOUR ROS SETTINGS ARE CORRECT! %%%

>> ROS_DOMAIN_ID = “4”;
>> setenv("ROS_DOMAIN_ID", ROS_DOMAIN_ID);
>> getenv("ROS_DOMAIN_ID")
ans =
   ‘4'
```

- Run **ros2 topic list** in the MATLAB Command Window

```
>> ros2 topic list
/clock
/mocap/turtlebot1/pose
/mocap/turtlebot2/pose
/mocap/turtlebot3/pose
/mocap/turtlebotarena/pose
/parameter_events
/pause_motion
…
```

Network: **CoreMobileWiFi**
Password: **core_mobile-123!**

Step 4 – Run MATLAB TurtleBot Pose Demo Code

- Download **demo_turtlebot_print_pose.m**
  - Option 1: Canvas Modules/Experiments/Matlab Files: Robot Experiments/demo_turtlebot_print_pose.m
  - Option 2: https://gitlab.tue.nl/core_robotics/courses/tue4dm70/core_tue4dm70_turtlebot3_matlab_humble
- Run **help demo_turtlebot_print_pose** in MATLAB

```
>> help demo_turtlebot_print_pose
Example:
   ROS_DOMAIN_ID = "0";
   setenv("ROS_DOMAIN_ID", ROS_DOMAIN_ID)
   turtlebotPoseTopic = '/mocap/turtlebot/pose';
   demo_turtlebot_print_pose(turtlebotPoseTopic)
```

- Update your **ROS_DOMAIN_ID**

```
>> setenv("ROS_DOMAIN_ID", "4"); % ROS_DOMAIN_ID of SIMULATION COMPUTER
>>  turtlebotPoseTopic = '/mocap/turtlebot1/pose'; % YOUR TURTLEBOT POSE TOPIC
```

- Run **demo_turtlebot_print_pose**

```
>> demo_turtlebot_print_pose(turtlebotPoseTopic)
Printing TurtleBot Pose [/mocap/turtlebot1/pose]...
Turtlebot Pose is not received!
Current Turtlebot Pose >>> x: -1.06 m, y: -0.83 m, angle: 51.2 degrees
Current Turtlebot Pose >>> x: -1.04 m, y: -0.81 m, angle: 56.4 degrees
Current Turtlebot Pose >>> x: -1.03 m, y: -0.79 m, angle: 61.5 degrees
```


Thanks for your attention!