

# Plan for February 12 Lab

## “Duckiebox distribution ceremony”

Things in black are for Duckietown Staff, things in blue are for students.

**Summary:** Be at Beaverworks at 9:55 (<https://beaverworks.ll.mit.edu>), bring your laptop, leave with a duckiebox (if your robot passes the test). We start on time at 10am and we'll have a roll call. Late arrivals are processed later, and they risk not getting the duckiebox today because there is no time to test their robot.

- Main channel for this event is: **#lab01-feb12**
- Other relevant channels:
  - #equipment (I don't have X, etc.),
  - #help-for-accounts (for accessing the spreadsheet),
  - #help-assembly for help in assembling
- Important documents:
  - this document:  
<https://docs.google.com/document/d/13Da6URI6ZbZhJW7vIYYDj4xi1sKqMg24IDpAAc-VFC0/edit?usp=sharing>
  - the Big Spreadsheet for equipment  
<https://docs.google.com/spreadsheets/d/1b3KEM2XzHLus7hUtWyC2yCmo7V5HuooDISoMB-bEKnw/edit?usp=sharing>
  - Assembly guide:  
[https://docs.google.com/document/d/1QKSj5W-LNoSg6dvAPhilUOPcJvVdRBCL\\_uKQyGBBDsE/edit?usp=sharing](https://docs.google.com/document/d/1QKSj5W-LNoSg6dvAPhilUOPcJvVdRBCL_uKQyGBBDsE/edit?usp=sharing)

**Goal 99%:** at the end of the lab, there are 26 Duckiebots assembled in 26 Duckieboxes, and each of them has been tested by our testers (tested by Hang). We are confident that nobody will have HW issues later when they try RC. Everybody walks home with an SD card with Duckieimage v1.1.

Staff who is around for Thursday packing party 4-5:30pm: MN, SY, HA, AC, LC, DH

Staff who is around on Friday 9am-1pm: AC, SY, HA, MN, HZ, DH(>11am), ???

Contacts for the day: AC: 339-201-1209 SY: 510-529-8739 MN: (813) 928-0393 HZ: 857-272-2576 HA: 617-335-1855

## Special instructions

- Students: you need a laptop with Ethernet connection OR a laptop with 5GHz network.
- Regular students: you will go home with a Duckiebox, of which you are responsible.
- Soldering division: we provide everything - actually there is going to be little soldering.
- **Unconventional students: You can hang around, but not around Hang.**
- Students who got the box already: do not open the box until further instructions.
- **Teddy: DO NOT OPEN THE BOX** until further instructions from AC received.
  - To clarify: “Do not open the box” means “The lid remains closed” and the integrity of the box is preserved.

**Clean-up instructions: Whatever the state, at 12:45 we start packing up. At 1pm we need to be completely out of the door (there is another class of similar size coming in at 1pm)**

**Contingency plan, should we decide we need more time (not robots tested):** re-group at 1:30pm in Stata Lounge. If a duckiebot is not tested, the entire Duckiebox stays with the staff.

## Before Friday

- MN: PIZZA - order today or not
- SY: check the two portable monitors
- AC: print the media release forms  
<http://web.mit.edu/cps/pdf/MIT-media-release-form.pdf>
- AC: put nicknames in spreadsheet

## Timeline for Friday

**8:45:** AC comes with the car in Stata parking level P1

**8:45:** We meet in 226:

AC distributes the student spreadsheet in printed form

- “disassemble” (separate chassis) for bmwm3, lebaron, and leon - **note that bmwm3 might not have the right spacers -- talk to Misha -- he has right spacers and screws**
- bring 3 more: pontiac (retrieve from 32-232), sonata, 2cv
- discuss whether assembled chassis counts as one item in spreadsheet

- **LABEL EVERYTHING WITH YELLOW TAPE. NOTHING WORTH >=\$50 (that is not in the Duckieboxes) LEAVES STATA WITHOUT YELLOW TAPE or other clear Duckietown identification**

We review the checklist.

[ ] We need 6 Duckieboxes v. 0.9 **or better** (unsoldered)

[ ] We need 21 Duckieboxes v. 1.0

[ ] AC: provide summary spreadsheet link to everybody

[x] One access point - Airport Express (the new one) )~~“defective” one consdiered not defective~~

[ ] One backup access point

[ ] AC: Media release form (20 copies printed)

(<http://web.mit.edu/cps/pdf/MIT-media-release-form.pdf>)

[ ] AC: 40 - Assembly handouts - to be given only if deemed necessary by AC (e.g. the network doesn't work)

[https://docs.google.com/document/d/1QKSj5W-LNoSg6dvAPhilUOPcJvVdRBCL\\_uKQyGBBDsE/edit?usp=sharing](https://docs.google.com/document/d/1QKSj5W-LNoSg6dvAPhilUOPcJvVdRBCL_uKQyGBBDsE/edit?usp=sharing)

[ ] ~~AC: 40 -- RC handouts Step 2--~~

~~[https://docs.google.com/document/d/1HP5ao3LwgQ1EkdRb3ksiMg8zdrpJXjSIH\\_XG2RFHyes/edit?usp=sharing](https://docs.google.com/document/d/1HP5ao3LwgQ1EkdRb3ksiMg8zdrpJXjSIH_XG2RFHyes/edit?usp=sharing) only web and only beta~~

[x] 16 camera calibration sets - **in Andrea's car**

[ x] bring the 5 soldering stations (~~check beaverworks~~)

[ ] **MAT for soldering stations -- HA asks TIG tomorrow**

[x] **box of spare parts - (MN: make a list)**

3 CanaKit

Rest of 32 Flash drives

Rest of 32 GB SD with v1.1

3 Fisheye cameras

3 Camera cases

3 batteries

Rest of 5mm short -- **best to exchange them! with long 5mm!**

Duckies -- because why not?

Rest of Motor HATs

Rest of PWM Hats

Rest of GPIO breakouts

3 Joystick controllers

A bunch of M/M wires

Rest of Nylon Standoffs

Nylon hex nuts  
Nylon screws  
4 3x.5mm screws  
Nylon spacers

Bunch of double sided tape

3 boxes wood signs

printed traffic signs -- to be handed out to boxes!

Rest of zip ties

Copies of packing list

[x] 5 mouses 5 keyboards (~~need to get from somewhere~~)?

[ ] (~~stretch goal~~) duckietops for students

[x] 2 8 port Duckietown switches

[x] 2 switches from TIG

[x] 20 more ethernet cables from TIG

[x] 10 long ethernet cables (2 extra long) (~~ask TIG if we don't have enough~~)

[x] 5 power strips

[x] very small flat head screwdrivers

[x] tripod for that camera

[x] duckieboxes with complete robot (~~HA, SY, MN~~)

[x] 2 HDMI monitors requisitioned from Leonard lab

● ~~SD card with v1.1 (Or a few SD cards for testing)~~

● Special robots:

○ 3 cannibalized chassis (bmw, leon, ?)

○ 3 ready to be sacrificed (sonata, 2cv, ?)

[x] name tags, sharpies

[x] label maker and rolls

~~who travels to get the 3 chassis?~~

9:15 in 226: we have gone through the checklist and we have everything

9:15: AC drives car in the baby pickup whatever

9:20: we load 12 boxes in the car

9:25 4 people walk to Beaverworks with one box each

9:25 16 boxes at BW.

9:25: HZ + SY remains at BW and looks for the cart, and start moving

● SY/HZ: Setup network

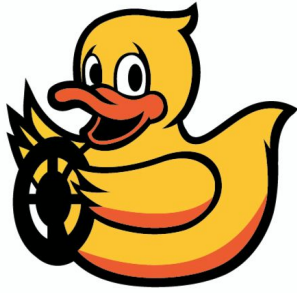
9:25: others: go back to stata, same trip again

**milestone: 9:55: we have all people and equipment in BW**

10am: students come in, get a name tag, ("Nickname/handle/1.0|0.9")

AC/HZ doing the welcome and the 1.0/0.9 assignment

and sit in the classroom, and we have a smile on our face, and we are relaxed



10am: Students sit in the classroom and wait, and in the meantime:

- Please connect to ethernet.
- If you cannot do ethernet, connect your laptops to “Duckietown-5ghz”. Password “quackquack”. In any case, do not connect to ‘duckietown’.
- IF you cannot do that, connect to one of the MIT networks.
- If connected, open two tabs:
  - this Google Doc
  - the Google Sheet “what’s in the boxes?”  
<https://docs.google.com/spreadsheets/d/1b3KEM2XzHLus7hUtWyC2yCmo7V5HuooDISoMB-bEKnw/edit?usp=sharing>
- NEVER CONNECT TO BOTH ETHERNET AND WIFI (unless you know what you are doing; e.g. you know what is a routing table)

10:10: all students are sitting in a chair with 2 tabs open, and we are ready to start.

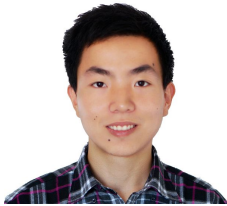
**announcement: pizza at 12, no food at all in classroom and lab space; robot does not pass the test -> no duckiebox today (contingency tbd); everybody packs at 12:45 and out of the door at 1pm; regroup in 32-226 if deemed necessary.**

10:10-10:15: Safety brief by John the facility manager

10:15 Everybody knows about these Slack channels : #help-for-accounts, #equipment, **#lab01-feb1**

10:15 : roll call from spreadsheet (private one, HZ knows which)

- If you arrive later than the roll call, you will skip the first phase. You have to tell the TA Hang Zhao who will put you in the queue.



- Hang Zhao:

10:20: now we know which people are there. **distribution of Duckieboxes** - when you are called, stand up and get your box. DO NOT OPEN THE BOX. Squeeze the duckie (that you brought from home, NOT THE ONE IN THE BOX, IF SOMEBODY TRIES TO OPEN THE BOX).

10:30: Now everybody has a box. Give box to people who were late, under plenty of duckie squeezing.



- Tutorial track: assembling the robot. Led by AC + HZ in the classroom.
- Advanced track: soldering: led by HA + DH in the lab space.

## Part 2 - track 1 - assembly tutorial

In classroom, Supervised by AC + HZ:

Please see instructions here:

[https://docs.google.com/document/d/1QKSj5W-LNoSg6dvAPhilUOPcJvVdRBCL\\_uKQyGBBDsE/edit?usp=sharing](https://docs.google.com/document/d/1QKSj5W-LNoSg6dvAPhilUOPcJvVdRBCL_uKQyGBBDsE/edit?usp=sharing)

- Tutorial of assembly for dummies (screws and bolts)

ONCE YOUR ROBOT IS ASSEMBLED, go to Testing Station.

## Part 2 - track 2 - soldering / fast track

2nd hr - second track supervised by HA

- Soldering of hats and independent assembly; instructions here:
- [https://docs.google.com/document/d/1QKSj5W-LNoSg6dvAPhilUOPcJvVdRBCL\\_uKQyGBBDsE/edit?usp=sharing](https://docs.google.com/document/d/1QKSj5W-LNoSg6dvAPhilUOPcJvVdRBCL_uKQyGBBDsE/edit?usp=sharing)

ONCE YOUR ROBOT IS ASSEMBLED, go to Testing Station

## Part 3 -Testing

**You cannot leave before SY tells you to leave. Either because the robot is tested, or because testing is not possible (for whatever reason). If a Duckiebot does not pass the test, the entire Duckiebox stays with the staff.** The staff will fix it, and then we will schedule a time to be picked up.

Go to the testing stations:

1. Say "Hi, Shih-yuan".
2. Get explanation of how to pronounce Shih-Yuan correctly. Once SY is satisfied, go to step 3.
3. Tell SY: "My nickname is ..., my handle is ..., and I think a great name for the robot is ...". If SY is satisfied with the name of the robot (hostname constraints), go to step 4.
4. Give the robot to SY.
5. **Ask the labelmaker operator (?)** to print out 4 labels for your robot and box.

6. Wait until SY tells you: “You are good to go” or “test not passed, \_\_ is not completely operational.”.
7. If SY says “you are good to go”, go home with the Duckiebox.
8. otherwise, you will go home without the Duckiebox.

We will be in touch with further instructions.

## Testing procedure (SY, HZ):

### Pre-test:

1. Make sure testing laptop is connected to duckietown through ethernet.
2. Turn **the car** on and test if duckietown wifi is working by ssh into it from testing laptop.

### Test for each robot:

1. Plug power to hats (not the Pi yet), make sure green lights on both hats turn on.
  - a. If not, failed hat power test (Potential problem: wiring, battery)
2. Insert testing sd card (megaman’s soul) into Pi. (Double check if inserted correctly)
3. Power the PI, make sure the red light is on and green light flashing.
  - a. If not, failed PI power test (Potential problem: battery)
4. Wait for about 30sec or so, check if the blue light on wifi dongle turns on
  - a. If not, wifi dongle isn’t working (or network issue). Failed the wifi dongle test. (Potential problem: wifi dongle)
  - b. Try ethernet direct connection with share ethernet on testing laptop (Wolverine). If not connected. Failed network test.
5. laptop \$ ping megaman.local
  - a. If no, failed the network test.
6. laptop \$ roslaunch duckietown joystick.launch veh:=megaman
  - a. Hit A on joystick to wake it up. Make sure the switch on top is on the X side (not the D side) and the Mode light is off. (If the Mode light is on, hit Mode to turn it off)
  - b. Move joystick and check if the vehicle **moves correctly given commands**.
  - c. left joystick up: Vehicle move forward
  - d. left joystick down: Vehicle move backward
  - e. right joystick right: Vehicle turn right
  - f. right joystick left: Vehicle turn left
  - g. If no, failed the joystick test. (Potential problem: joystick, wiring of hats.)
  - h. Ctrl+C when done
7. connect to screen, raspistill, and the image should pop up.
8. laptop \$ roslaunch duckietown camera.launch veh:=megaman



- a. Check if the red led light on the pi camera turns on. If not, failed camera power test. (Potential problem: connection, camera itself)
  - b. Open rviz and check if image viewable. If no, failed the camera test. If not, failed camera test. (Potential problem: wiring, camera)
  - c. Ctrl+C when done
9. ssh into the vehicle and then `$ sudo rm /etc/udev/rules.d/70-persistent-net.rules`
    - a. This is to prepare for the next soul transplant
  10. `sudo poweroff`, wait until green light stop blinking then remove sd card.
  11. Write down name, handle, robot name on spreadsheet. (Should this be the scuderia at <https://docs.google.com/spreadsheets/d/1PZv7NaHG4sufy2vfNZ817xU82VV6wmldeEGGMdbmHcXE/edit#gid=0> or a separate sheet?)
  12. High five the student.
  13. Keep the box if the robot didn't pass. Let the student take the box home only if it passed.

Staff will fill this: **NB: Further updates are in the Lab 02 doc:**

<https://docs.google.com/document/d/1tj4uqlrxXqfvF9u4cdMGYxMIgnCFleJ016DWK4zI4E>

**U**

- Robots who have passed the test: Tester / [Nickname/handle/robot name]
  - 1 Shih-Yuan [Robert/@rkk/ada]
  - 2 Shih-Yuan [Tristan/@tristan/morty]
  - 3 Shih-Yuan [Catherine/@catliu/thing]
  - 4 Shih-Yuan [Erlend/@eharbitz/neptunus]
  - 5 Shih-Yuan [Joe/@joe-wl/milo]
  - 6 Shih-Yuan [Ari/@onasafari/oreo]
  - 7 Hang [Victoria/@vdean/cookie]
  - 8 Hang [Sam/@samcerq/pipquack]
  - 9 Shih-Yuan [Takke/@atacchet/ayrton]
  - 10 Hang [Amado/@amadoa/amadobot]
  - 11 Hang [Guilia/@qlai/duckula]
  - 12 Hang [Guy/@rosman/duckmobile]
  - 13 Hang [Brandon/@araki/bill]
  - 14 Hang [Nick/@npd22/nikola]
  - 15 Hang [Alex/@agirard/quackmobile]
  - 16 Hang [Jenny/@jenshen/Julie]
  - 17 Hang [Sang/@sangukbo/setlist]
  - 18 Hang [Veronica/@vmlane/lily]
  - 19 Hang [Michael/@mfe/redrover]
  - 20 Hang [Abhishek/@abhi/rex]
  - 21 Hang [Lapentab/@lapentab/magitek]
  - 22 Hang [Hans/@hanssusilo/penguin]
  - 23 Hang [Teddy/@teddy/starducks]
  - 23 Hang [Wyatt/@wubella/charles]
  - 24 Hang [Noam/@nbuckman/ernie]

- Robots that have not passed the test (the Duckiebox stays with staff):
  - Tester / [Nickname/handle/robot name: problem for which it doesn't pass]

Robots not completed (and therefore not tested):

- Jenny - told Andrea she can be present some time on Tuesday

People that got a robot but are not present in the list above:

-

People that didn't show up even though they were supposed to:

-

Special things happening:

Question to be answered:

when do we do RC?

- What's the status with the soldering - all good
- We have 7 students willing to help with soldering - when should they do it - during the lab - directed by HA
- sd cards -got them

Misc tasks to be categorized (add with "?" as name):

- ~~?: [Wed] Check with TIG about equipment~~
- AC: Check BW schedule for Tue (Feb 16) night - or find another classroom for RC tutorial - Tue 10am in 262
- HA?: Find 10 soldering irons for Friday we have 5, good enough, + some from BW
- AC/MN: buy the name tags and a sharpied
- find cart to bring boxes to the car (they are 3 in 32-235)
- AC: Andrea should ask special permission to use load/unload in parking lot (LP consider this optional - mitigation is park in the daycare pickup and dropoff)
- AC: test defective access points
- AC: set up new Airport Express
- AC: check whether there are soldering station in Beaverworks and if they work
- AC: check if beaverworks have HDMI screens (LP also ordered one which should be in 232 today or soon) - we also bought another at MicroCenter

Tasks to be done by Tuesday night:

HZ: move packages to 232

MN/LP: finalize the what's in the box? so that there is one column to the left for each "goal configuration"

- AC/MN get at a minimum of 23 but preferably 30 micro SD cards

## Tasks to be done by Wednesday night:

### **MN?/HZ?: 15 SD cards ready and tested (booted)**

LC, HA: review the assembly handout

AC: get key from CSAIL HQ (or just steal it from Ross... whichever is easiest)

AC: give key to Misha

- send MIT ID, full name, email, kerberos
- AC: call facility manager - check if beaverworks have HDMI screens - no they don't - FIND SCREENS AT CSAIL/TIG
- ask BW for ethernet access towards internet (essential!)
- 

- HZ: check Rasp PI connects to ethernet

- Ask TIG for:

- switches for another 38 ports switch
- 43 6 meters cables

### **MN?/HZ?: 30 SD cards ready and tested (booted)**

- **LP: 8am call Lisa Gaumond (617-324-1543) to get tracking number for chassis.**
- **Keep calling until 10am. At 10am we make a call.**

**CASE 1 (bad): IF (a) we can't get a hold of Lisa or (b) the tracking number shows the chassis will not show up on time:**

**-LP/AC 10am finalize decision on how to proceed.**

- **AC: pick up signs from copytech (11-004) and take to 226.**
- **AC (or delegate): cut enough signs to be included in the boxes (could be during packing party)**

Possible Issues:

- Soldering of the hats
  - Current documentation isn't enough. Need supervisor (HA)
  - Do we have enough equipment?
- SD card
  - We need a few that are guaranteed to work (Maybe a good time for v1.2. LP: I think stick with v1.1)



# Final status as of Fri 5pm (AC's assessment)

**Summary: 50% goal accomplished. Remaining can be done easily (<=1 hour of work + 10 minutes of testing), except one. Reconsider 1 day schedule slip.**

## 5 people in an abnormal state:

- Val - has a tested robot, but the box is not in "what's in the box" spreadsheet |  
Val: wait for Chris video, talk to Misha for parts missing.
- Teddy - has a box, unassembled robot  
Teddy: wait for Chris and then assemble and then contact Hang  
**(Note: Teddy has a box, against current policy, the policy having changed this morning.)**
- Nicola - did not get his box on Friday  
LP: please contact Nicola
- Guy - robot tested, but forgot his box in 226  
Guy: please come get your box in 226.
- Mohsen, Ted, Yajun, Jason, Sedat: should get box but haven't yet because of supply chain problems or scheduling
- LP: please evaluate status of supply chain, organize distribution and testing

## 1 box in an abnormal state.

- Box 19 found around. It seems complete except chassis. Placed in inventory.  
MN: please complete box and make it the demo box (always available next to Shamrock)

## Misc:

- VeRo's box has a lost PWM hat  
MN: if not found by tomorrow, replace (cannibalize box 19?)
- conference room booked 10am-2pm? on Tue

## Regular states:

- 12 robots are tested
- 12 Duckieboxes in 226 with unassembled robots:
  - 1 needing 2 hours of work
  - 6 needing 1 hour of work z
  - 5 needing 15 minutes of work (ask hang to just finish these?)

## Next steps:

- CW: please upload video with instructions for val and teddy
- Duckietown Engineering Management next steps:
  - tag people in this document and in #reminders
  - LP: talk with LC regarding current plan/schedule slip
    - [send out doodle for Tuesday only to people]
  - discuss schedule slip

- ?: check that we returned the TIG equipment
- ?: double check that big ticket items were back in 226
- consensus from friday 1pm: the only way to continue with the lecture as planned on tuesday is if everybody has their robot working by 3pm on tuesday otherwise we would use lecture time

## Lab assessment

- what went wrong:
  - boxes were not completely packed the night before - lost time in the morning
  - severely underestimated time to mount robot
  - we invaded Brian Williams' space without asking for permission
  - we requisitioned Sudeep's monitor without notification
- what worked well:
  - testing procedure
  - last minute delivery
  - soldering
  - organization | very military style
  - pizza
  - fast reaction for contingency (though not precise)
  - Beaverworks is very very happy - we promised to be out at 1:00 and we were out at 1:00 - John said we were the most polite ever, and liked the handouts, suggested we should come to BW for STEM outreach programs
  - SY: some students showed up to help transportation from 226 to BW. Very helpful. Same from BW to 226.
- wasted effort:
  - Slack channels unused (people were still busy building robots; will use a lot in the following)
  - Brought speakers but forgot to ask our DJ for music
  - Testing stations and extensive wireless network set up in Beaverworks but unused because robots not complete
- Recommendations for next time
  - More organized way to store/transport equipments to and from BW. Ex: Box for network related stuff, bag for power cables, etc. Put people in charge of a specific box, like SY for network equipment box. Less likely to lose stuff.
  - Trust the students more on simple/labor intensive tasks. This has to go hand in hand with rigorous testing/checking procedure and detailed instructions. Ex: putting stuff in the box and check the check list. Pre-boxing party should be inventory check (we make sure we bring N joystick, M batteries, etc). Boxing party should be at BW with student lining up to pickup equipments, put in box, and check spread sheet. Staff could be the last station to double check.