15th June - Planning Day:

* GitHub
* demo car.
* give Bryce the second car.
* Demo colour mask.
* Assign tasks.
* Ask Zac about perspective transform.
* Ask everyone to read the rules

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| Week 0  (10-16 June) |  |
| Week 1  (17-23 June) | Mechanical + 3D printing.  Perspective transform.  Wireless connection + GUI.  Colour masking: yellow, blue and purple.  ~~How to integrate a MATLAB function call into Python.~~  Firmware for the car. |
| Week 2  (24-30 June) | Integration.  GUI dashcam recording functionality for debugging.  Path planning algorithm |
| Week 3  (1-7 July) | Fine tuning and debugging. |
| Week 4  (8-10 July) | Win the competition. |

# Tasks

## Wireless video feed and GUI

Maybe use this app and example code:

<https://www.youtube.com/watch?v=0hT2cGSqPfk&ab_channel=Iknowpython>

Gui layout ???:

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| --- | --- |
| Raw video feed | Annotated video feed |
| Print out from the UART RX, which contains the error message | Bird’s eye video of the track  The desired direction and speed of the car |

# Colour Masking

* Test using the tapes.
* Three colours: yellow, blue and purple (the obstacles). Mask each colour individually, since different colours mean different things.
* Input: a frame from a raw video feed
* Output: the outline/edges around areas of interested colours (blue, yellow and purple).
* Manage glare and improve reliability (this was an issue last year)

# Perspective transform

* Depends on the camera placement, so this depends on mechanical task.
* Converts the camera point of view to a bird’s eye view (so it is easy to analyse the position of the edge of the track.
* Input is the edges/outline/contour from the colour masking task, NOT the raw video feed.
* The centre/origin of frame is at the centre of the phone.

# Mechanical and 3D printing

* Stability.
* Centre of gravity and reducing inertia, so it is easier for the car to turn.
* Camera placement: ensure a good field of view. (IMPORTANT)
  + Maybe hold the phone landscape???
  + Or tilt the phone???
* Phone:
  + Password: 123456
  + On the homescreen, IP webcam allows you to see the camera view remotely from a computer (might be handy). The instruction video (don’t worry about the Python part): <https://www.youtube.com/watch?v=0hT2cGSqPfk&ab_channel=Iknowpython>
* Bolts for securely attaching to the circuit boards (since gyroscope can’t wobble all the time)
* Needs to hold different configurations of power bank (since we need backup components)
* 3D print must be RED, since the majority of the car needs to be red (it is in the rules)
* Protection to damp the impact of a front-on collision. (Nice to have)
* Cable management (Nice to have)
* Preferable (**not necessary**) The corner of the board with resistor R3 and R4 is facing front right.

# Firmware

* Controls the motors on the car.
* reads from the gyroscope and control system.
* Receives the commands via Bluetooth using UART communication at 115200 baud rates.
* The car stops if UART/Bluetooth disconnected for a while.