ENCE461 Wacky Racers Assignment Critique

Adam Finlayson, 22219865, Group 17

1   Strengths

Design: Optional backup systems: We designed the board to have optional backups for both the piezo and IMU. It was important to have a backup for the IMU in case the soldering of the on board IMU did not work, and if the motor driver did not work for the piezo. (We did not end up needing to use either of these backups).

PCB Layout: Pin selection: when designing the components, the pins were chosen to work best with the expected layout of the board. Wiring: components that were switching the fastest were placed closest to the board and had the most direct connections (IMU, Radio, USB, Serial Debug), components that were switching slowly were placed further away and routed around more important components (Piezo, LEDs, Joystick, Buttons). The PCB layout required no changes or rewiring.

Overall wacky racer: Robust and had no problems uploading code.

2   Weaknesses

Design and PCB layout: the design and layout of the board had no weaknesses and did not interfere with our ability to complete this assignment.

Overall wacky racer: The control of the racer was difficult and needed more work. In testing the control was good enough, but in the final race the racer did not perform the same. This may have been a problem with the radio.

3   Improvements

I think we over designed the board, making it difficult to fit everything on the board. The external peripheral input and outputs were designed with no specific purpose in mind. The motor driver used to drive the piezo had a separate power circuit (own fuse and isolated), which was very unnecessary.

More testing on the radio would have allowed us to find better channels for clear transmission. I also wanted to implement a scanning function with the intent to search for anyone using channels (1 - 120), but still using the code 0x0123456789. I think this could have been interesting to test.

The control of the racer was more important than I expected, and we should have made a more robust control algorithm.

4   Contribution

I think I contributed well to this assignment. I did a lot of the work throughout the design and PCB layout stages, doing the device selection, pin selection and component layout and connection. I also actively contributed to the coding of the board, working with Harry to implement the functionality of our hat board. I also worked with Harry and Fraser to work out what information was important to send via the radios.

5 Recommendation to future students

The biggest recommendation I can make it to put a lot of time into the design and PCB layout of the board. This makes achieving the milestones throughout term 2 much easier to meet and generally reduces the stress of the project.

I also think that it is very important to utilize the help of the tutors. They are a great resource and can help fix problems quickly that would usually take far more time on your own.

This project is set up in an interesting way. I think it is important to lean into that fact and design the wacky racer to not only be functional but interesting. This makes the time required for this project much more bearable.

6 Recommendation to improve project

This project was both challenging and interesting which made it one of my favourite projects I have done. The only part of this project I did not like was my lack of understanding in how the background code worked. I tried to look through the code to figure out what was going on but had a hard time. I would have liked if there were a couple lectures or workshops to go over this so I could better understand what was going wrong when my code stopped working.

7 Peer assessment

My Board (Hat)		Whole System	
Name	Score	Name	Score
Harrison Pollard	3	Fraser Rose	3
Adam Finlayson	3	Shan Zhong	2
		Harrison Pollard	3
		Adam Finlayson	3

8 Workload

Hat				Racer			
Design	Build	Software	Testing	Design	Build	Software	Testing
60	5	40	20	0	0	0	10