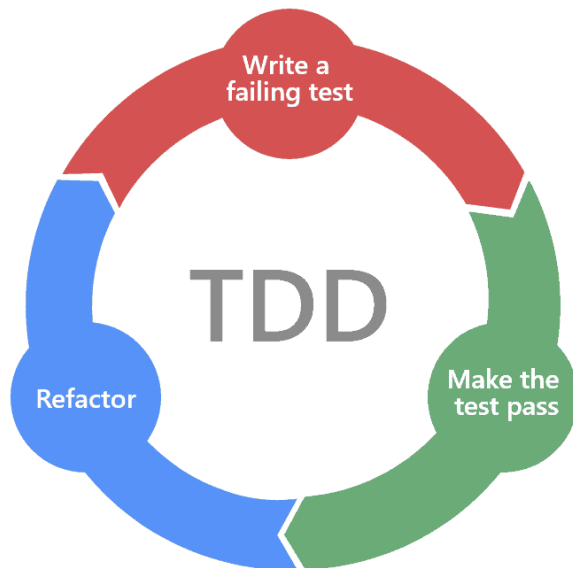
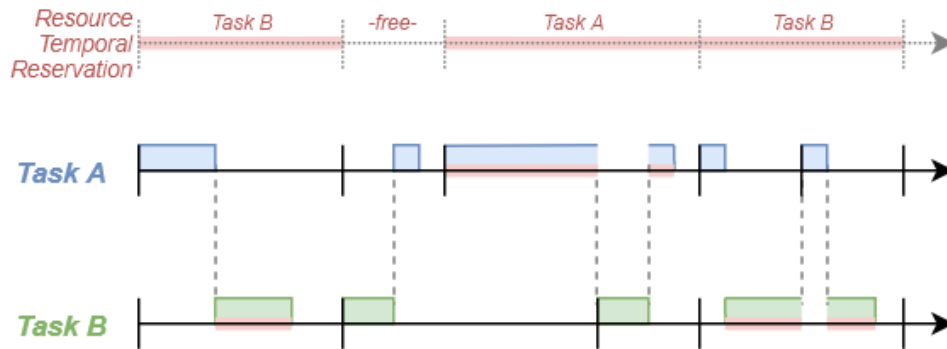


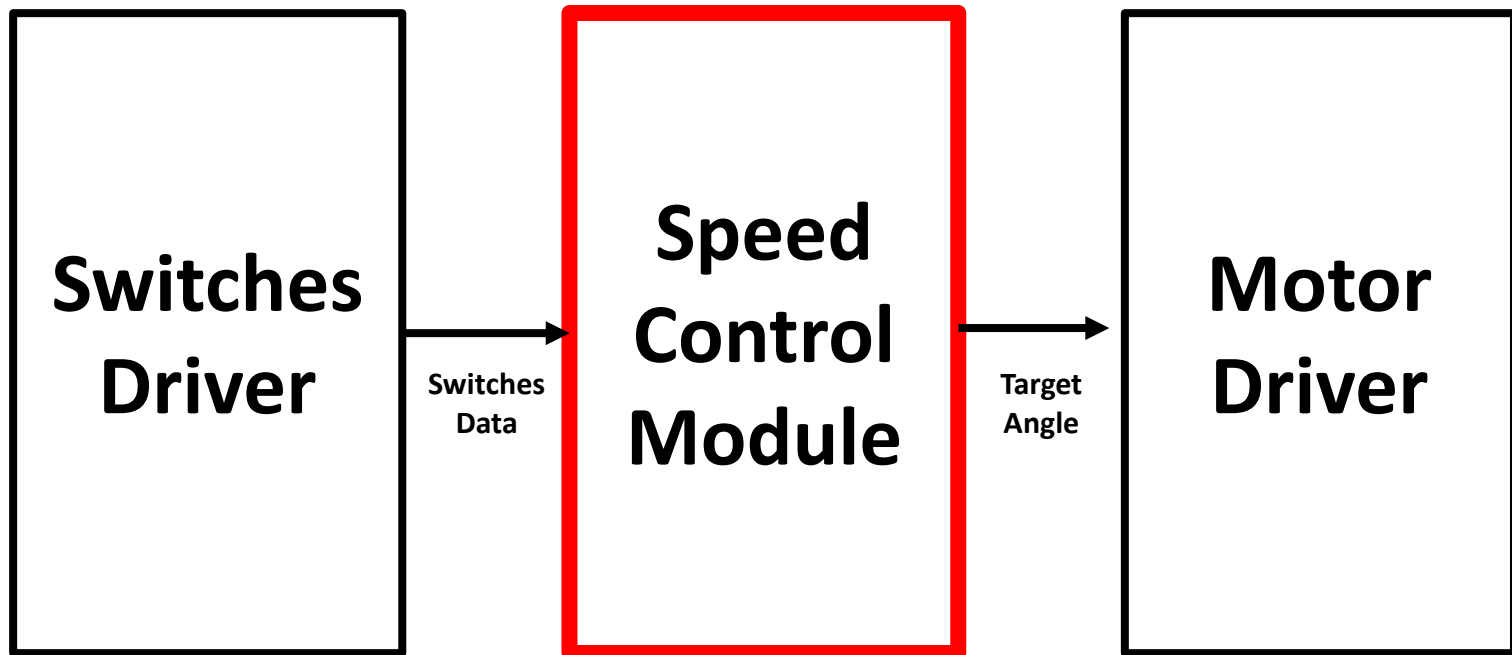
Case Study: Vacuum Cleaner Speed Control



Timeline



Challenge: Vacuum Cleaner Speed Control



Challenge: Vacuum Cleaner Speed Control – Description

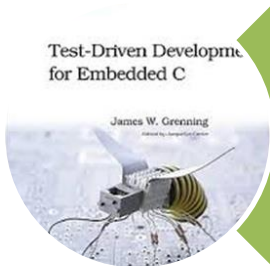
- ❑ Develop the “speed control” module such that:
 - ❑ The design follows a time triggered approach
 - ❑ Design is implemented using test-driven development approach
 - ❑ Used test design techniques are:
 - ❑ Equivalence partitioning
 - ❑ Boundary value analysis
 - ❑ State transition testing up to 1-switch coverage



Suggested Readings



Time-Triggering Reference



Test-Driven Development Reference



Testing Techniques Reference



Vacuum Cleaner Speed Control Specifications

- ❑ There are 3 speeds: minimum, medium and maximum speeds
- ❑ Default speed = medium
- ❑ There are 3 switches that can control the speed: “+ve”, “-ve” and “p”
- ❑ If “+ve” switch is pre-pressed, speed increases by 1 step if speed ! = maximum
- ❑ If “-ve” switch is pre-pressed, speed decreases by 1 step if not speed ! = minimum
- ❑ If “p” switch is pressed for 30 seconds, speed decreases by 1 step if not speed ! = minimum
- ❑ Priority of switches is:
 - ❑ “p” switch
 - ❑ “-ve” switch
 - ❑ “+ve” switch



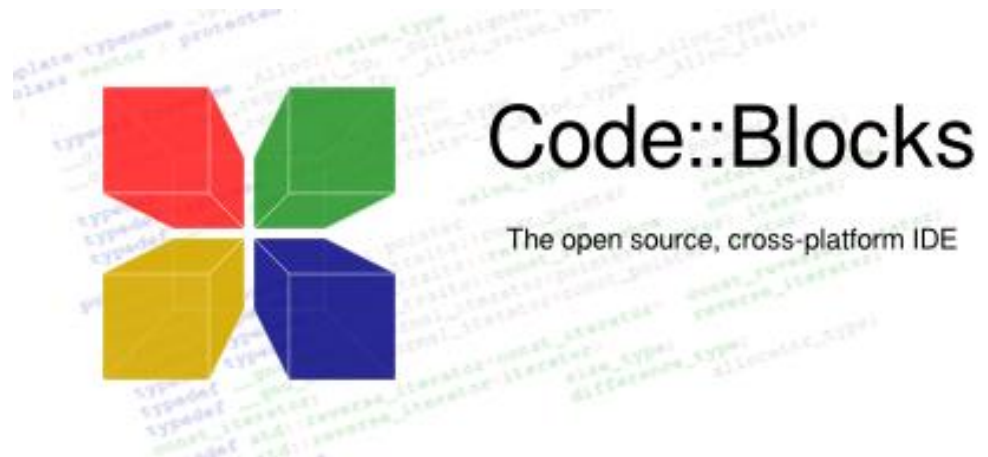
Motor Angles Specifications

- ❑ The speed control sets the motor angle according to the speed
 - ❑ Minimum speed → 140 degrees
 - ❑ Medium speed → 90 degrees
 - ❑ Maximum speed → 10 degrees



Tools

- ❑ Code::Blocks v20.03
- ❑ Unity C Test Harness
- ❑ CMock is a plus



Deliverables

- ☐ Your CV
- ☐ Full project folder (speedcontrol_firstname_secondname.zip)
 - ☐ Please, use led_controller.zip as reference for project structure:
https://drive.google.com/file/d/1BbSCAk0ZPfurkmFMvU-llCtSg_p_PaKK/view?usp=sharing
- ☐ Doxygen Documentation (doxygen_firstname_secondname.zip)
 - ☐ Source code documentation
 - ☐ Test documentation including testing techniques used for every test case
 - ☐ This should be in HTML format
- ☐ Please, submit your deliveries before deadline using this form:
<https://forms.gle/ueyidkPvEqmjR5Gz9>



How to Simulate HW on PC?

- ❑ A text file will simulate the switches data (switch.txt)

```
"+ve" switch state  "-ve" switch state  "p" switch state  "p" switch press time in ms
pre_pressed          pre_released          pressed           15
released             released           released          0
....
```

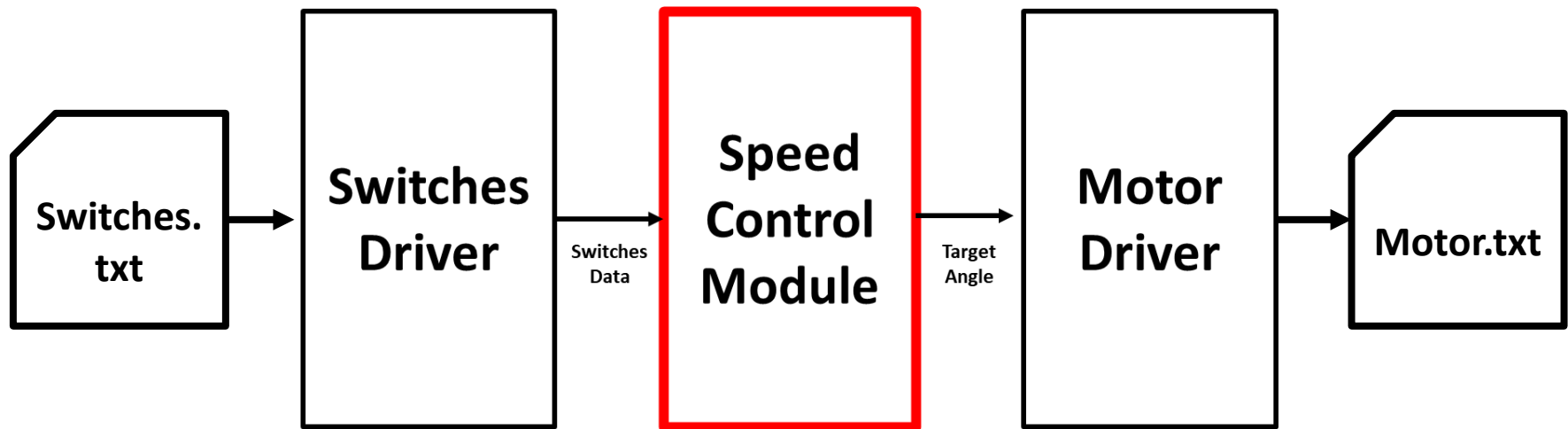
- ❑ Another text file will store the set motor angle (motor.txt)

```
Motor angle
170
140
...
```

- ❑ Both files should be inside the project folder structure and the project should run without problems
- ❑ Every line should correspond to a test case



How to Simulate HW on PC? cont'd



How We Evaluate?

1. CV quality, if OK we go to
2. Doxygen folder, if OK we go to
3. Project folder (correct operation + code quality)



We will

- ❑ Conduct 1 concept session to explain an example module developed by TDD - Feb 26th
- ❑ Conduct 1 session to speak about last internship wave – March 3rd



- ❏ To contact us:
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