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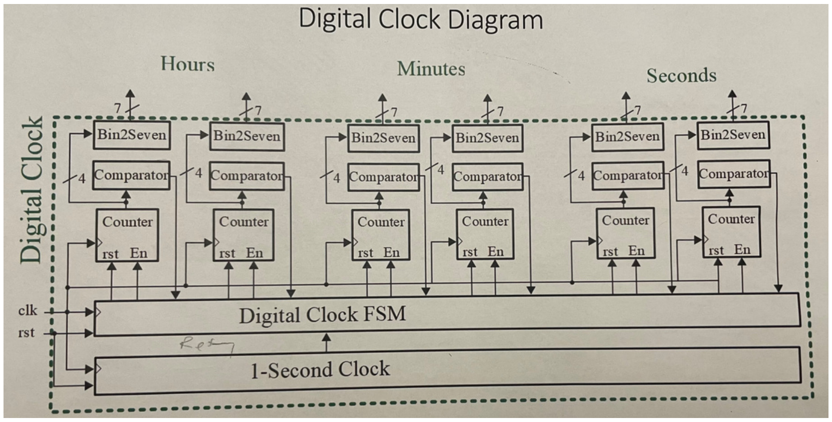
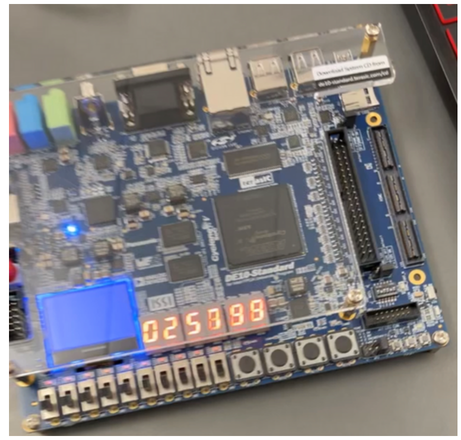
DIGITAL CLOCK - FPGA DESIGN PROJECT





What?

- Use an FPGA to create a digital clock with start, stop, and reset

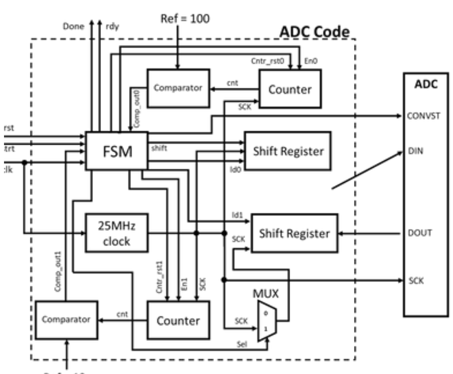
How?

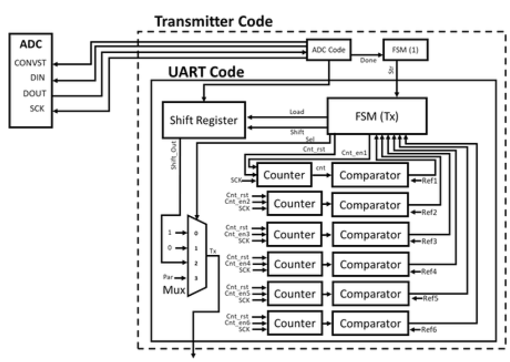
- Followed given block diagram for programs outline
- Implemented all segments using LED displays and switches on FPGA board

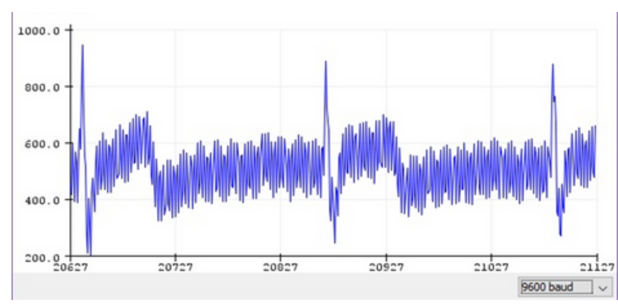
Results

- Successfully programmed and implemented fully functional digital clock on an FPGA

FPGA ECG - FPGA DESIGN PROJECT







What?

- Use **electrode sensors** to amplify and measure a human heart signal
- Use an **FPGA** to read the signal as data to then display

How?

- Convert a generated heart signal from electrodes to a digital signal for FPGA using an **ADC**
- Take the converted digital signal and transmit the serialized data from a **UART** to then be plotted via serial monitor

Results

- Scripted several **test benches** for simulations and debugging in **ModelSim**
- Completed scope of the project with over 1,500 lines of VHDL code

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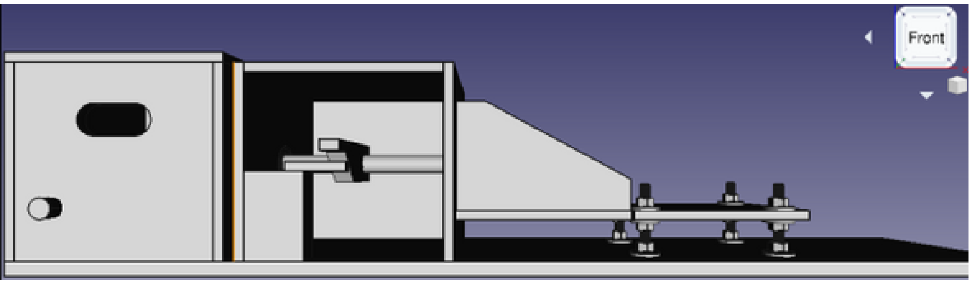
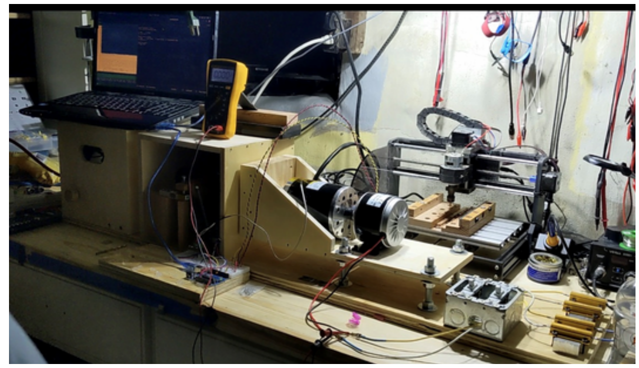
DYNAMOMETER - CAPSTONE PROJECT





What?

- Design and construct a dynamometer to run various measurement tests on DC motors
- Maintain a **budget** of less than $300

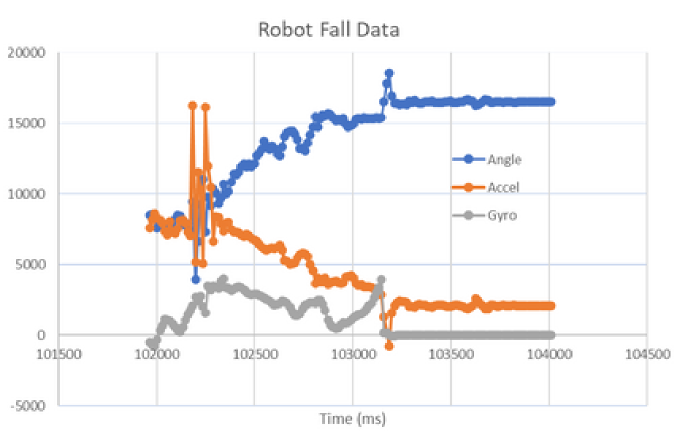
How?

- Constructed frame out of wood per **CAD designs**
- Programmed multiple Arduinos for measurement tests
- Created **Graphical User Interface** (GUI) for user friendly experience

Results

- Machine maintained measurement accuracy of **93%**
- Project will be kept as example for future students

SELF BALANCING ROBOT - CONTROL THEORY PROJECT



What?

- Fabricate and program a self balancing robot using a **parts list** and sensor libraries
- Program robot to undergo a **race** without falling

How?

- Used **Root Cause Analysis when** programming **PID** controller and race task on **RaspberryPi** with **Python**

Results

- Won 1st place in class competition

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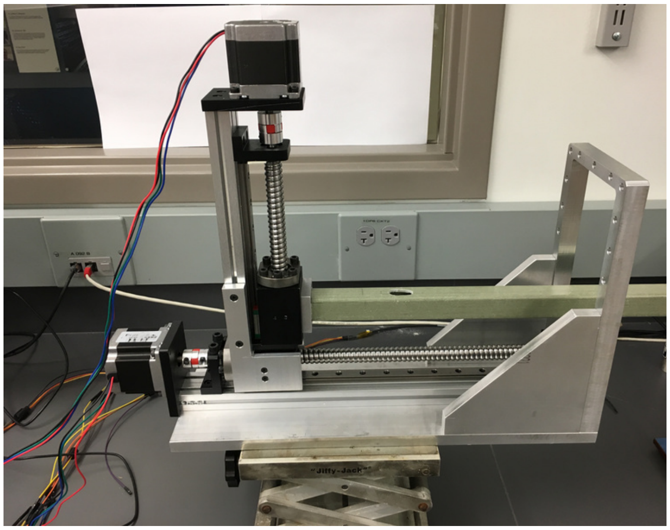
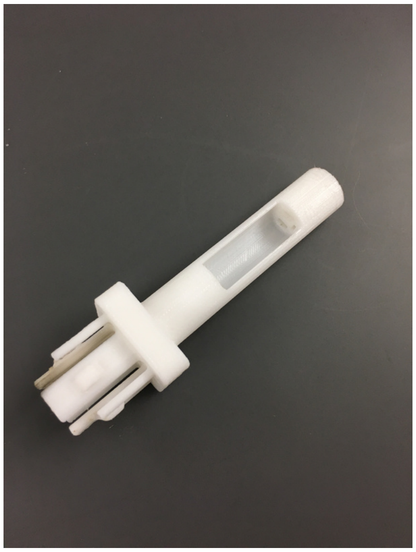
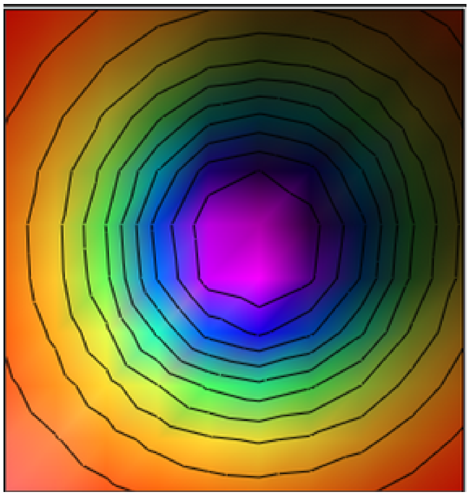
G-2 EXPERIMENT - FERMILAB SUMMER RESEARCH







What?

- Take measurements of the magnetic field using a **magnetometer** with different magnets
- Develop custom designs for accuracy improvements

How?

- Programmed script in **LabVIEW** to control acquired signals
- 3D-printed fixed probe for **hall voltage sensors**

Results

- The design and assembly was successful as it was able to take accurate measurements with different magnets of different strengths