

BarPro

ECE 445 RV Table and Points

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Requirements	Verification w/ High-Level Requirements	Points
1) Control Module: Accurately count repetitions of motion during a workout (+/- 1 rep)	1) A user will do full repetitions of motion during the workout and compare actual rep counts to rep count shown on the LCD screen to check if it is within the required range.	10 points: Control module is essential in counting reps by using input ultrasonic sensor data, controlling number of reps, and outputting the results to the LCD screen.
2) Sensing Module: Accurately read the user's barbell tilt angle (within +/- 3 degrees)	2) A user will purposely tilt the barbell with no weight to the left and right side to see if the unlevel barbell tilt angle notification is given by LEDs and buzzer after 10 degrees. This angle measurement will be verified by either a smartphone using its level of tilt angle detecting feature or Arduino IDE's serial display to see if it is within required range.	15 points: The accelerometer is an essential part of the sensing module for measuring the barbell's degree of tilt using calculated angles from the accelerometer's acceleration data.
3) Sensing Module: Accurately measure the height of motion during a workout	3) A user will do a full range motion exercise to set the min. and max. heights. The current height measured will be displayed on Arduino IDE's serial display.	10 points: Ultrasonic sensor part of the sensing module is essential in measuring the barbell's height in order to keep track of reps and form.
4) User Interface: Intuitive user interface with buttons and LEDs	4) A user will do a workout with the device, pressing each button to test functionality such as total reset and set increment / rep	5 points: Buttons, LCD and LEDs allow the user to input controls to the device and see outputted results from the

	reset and checking if LED/buzzer signal is given for uneven barbell. This includes testing the power button to check if the device turns on/off.	control module.
5) Power Module: 9V battery will power the Power Supply Module that will provide a voltage in the range 2.8-3.8V and 4.5-5.5V, respectively, for the 3.3V/5V power supply connections on the board	5) A multimeter will be used to measure the voltage on the board on both 3.3V and 5V power supply connections on the board to make sure it is within requirement range.	5 points: Power module is essential in providing 3.3V and 5V to the necessary components of the device.
6) A/V module: Minimal delay between user input and response from device	6) A timer will be used to check if the time between a user input such as an unlevel barbell position and notification from the device in the form of LED/LCD display and buzzer is less than 1 second.	5 points: A minimal delay between user input and response from the device allows for a seamless and enjoyable user experience.