Project Scope - <u>Ball Balance Game</u>

      I will write a game program which utilizes the Gyro to control the motion of a ball on the LCD screen. The initial position and velocity of the ball will be Randomized. The ball will only move on the X-Axis (left and right). After every 2 seconds, the counter force on the ball will increase. There will be a timer which counts up in seconds displayed on the screen. Interrupts will be used to signal the increase of the force and the ball's exiting of the screen.

Peripherals
- RNG
- Timers
- Interrupts
- LCD
- Gyro

      The <u>RNG</u> peripheral will be used to generate the initial conditions of the game (i.e. where the ball starts and what its initial velocity is).

      The <u>Timers</u> will be used to inform the user how much time has passed (this will be displayed on the LCD screen) and to determine when the difficulty increases (occurs every two seconds).

      <u>Interrupts</u> will be used conjointly with timers to raise the difficulty level. Every two seconds, the timer will trigger an interrupt which informs the program to increase the difficulty.

      The <u>LCD</u> will be used as the display for the game. It will render the ball that the user must keep on the screen.

      The <u>Gyro</u> will be used as a user input. It will keep track of the orientation of the STM32 and will move the ball accordingly.

Project Timeline

Milestone	Date
Project set up and planning - create all needed files, establish necessary inclusions according to the coding hierarchy	11/23
Set up application code and main function to make necessary function calls. This establishes the high level functionality and encourages modularity.	11/25
Set up RNG	11/26

Set up timer functionality interrupt control	11/28
Set up Gyro to read user input	12/1
Set up LCD to display the basic game	12/6
Link Gyro input to LCD display	12/8
Display timer info on LCD	12/10
Build scheduler	12/12
Project completion	12/13

Testing and Verification

      To encourage modularity, it is crucial that each subcomponent of the system works as properly and reliably. To achieve this, each component will be developed independently from the next and will be thoroughly tested/debugged. I plan to tackle each driver one by one keeping modularity in mind. Once specific, interlaced drivers are complete, I will focus on programming their interaction. I will work hierarchically up the ladder, ensuring each driver and its relationship to other drivers are functioning as intended and will debug as needed.

Coding Hierarchy