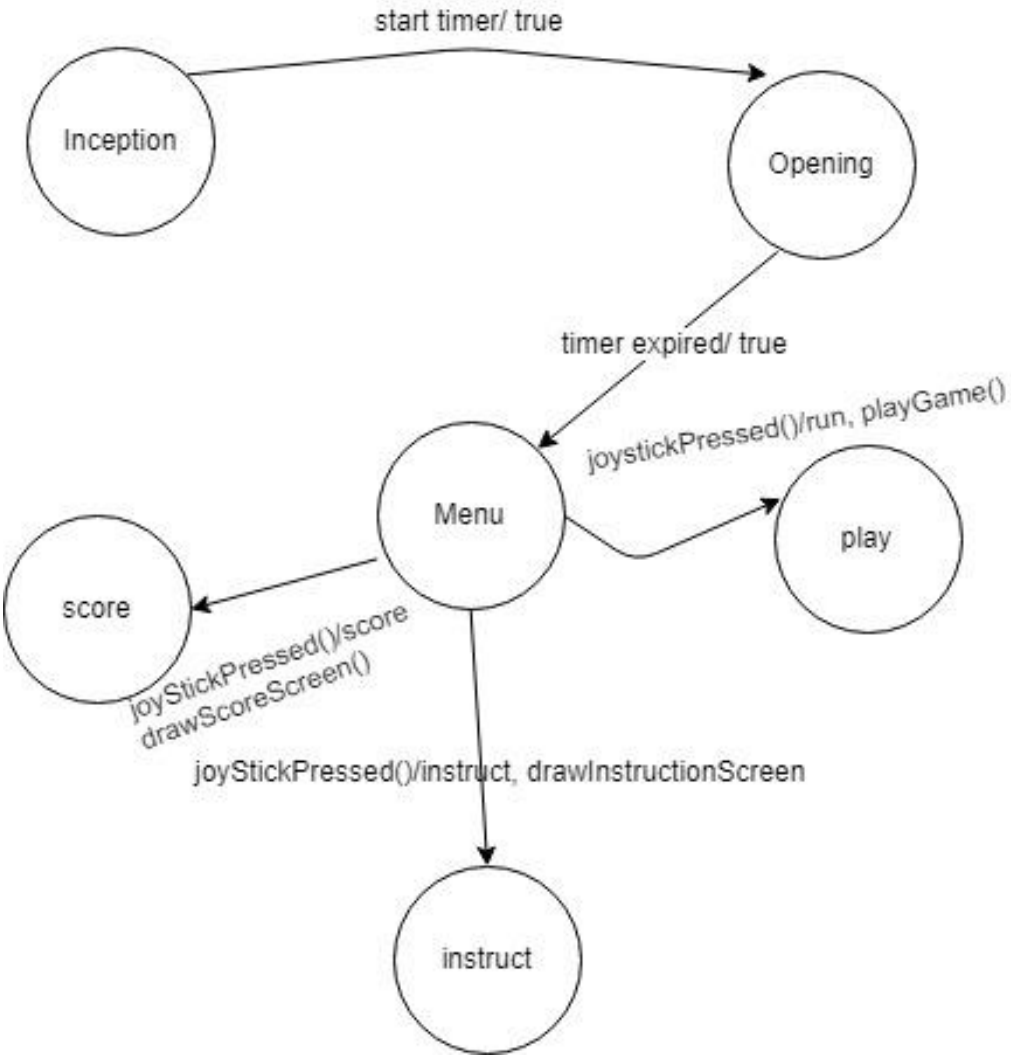
Section 1:

This lab is essentially playing a game of running from the obstacles that are quickly approaching the icon. The icon moves left to right and vice versa across four lanes of potential obstacles that spawn randomly. The obstacles spawn at a rate of a 50 pixel difference between obstacles, while the icon that the user controls tries to dodge. The entire code is similar to a game someone would create, with features such as an opening screen, menu screen, score history, instructions on how to play, and the actual game itself. The instructions say how to play, and the score history screen shows the 3 highest scores. Some extra added functionality also includes adding a back button from the score history and instructions screens to go back to the menu screen. The pause screen works almost well, but does not work fully.

Some of the bonus features that have been added in is the extra lane, so now there are 4 lanes instead of 3.

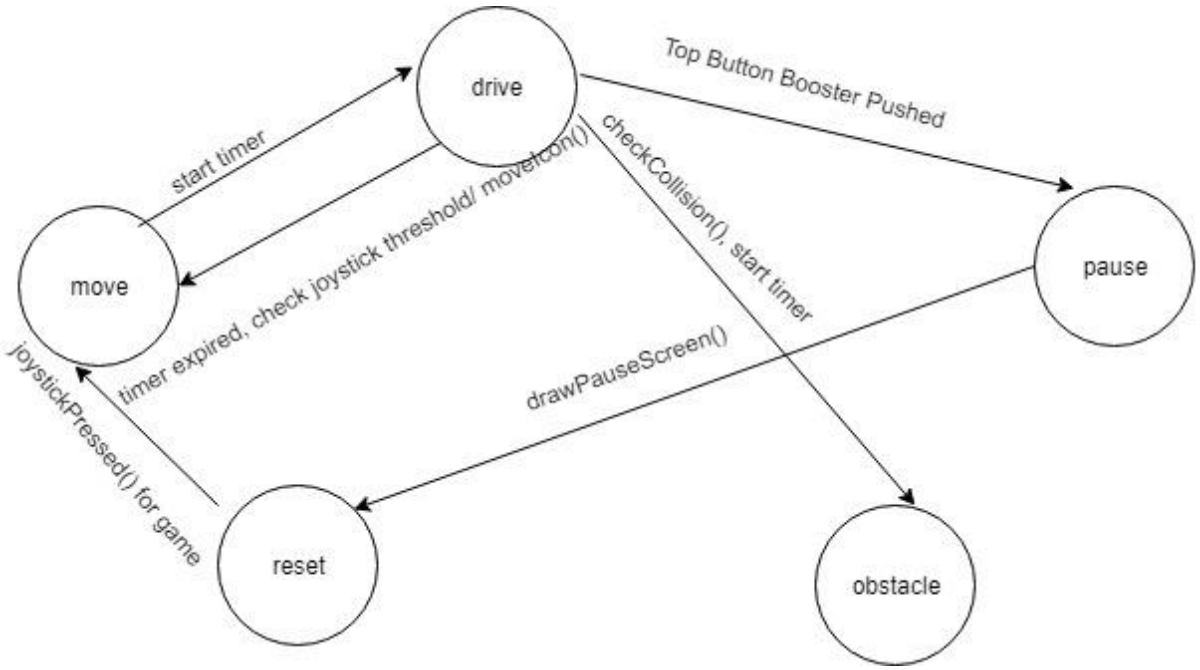
Section 2:



ScreensFSM

This FSM dealt with all of the menus from opening to the game screen. Once 3 seconds passed, the menu screen pops up and then the user can choose which screen he or she wants to go to. There can be 3 screens from the menu and then the pause screen can initiate from the play screen only.

FSM Input	Description
joystickPressed	See if joystick has been pressed by user or not, boolean
drawScoreScreen()	Draws the screen with score history
drawInstructionScreen()	Draws the instruction screen
playGame()	Draws the game screen and begins to play the game



playGame FSM

This FSM is used to drive the game. The initial state is move which starts the timer used to move the obstacles, and then is sent to drive. Drive checks for the timer expiration and joystick state and moves the icon accordingly. If the booster button is pushed, the state goes to pause and then goes to the reset case. In the reset case, the timer is used to go back to the menu screen to restart the game.

Section 3:

Functions from Display_HAL.h

```
void InitGraphics(); - initializes graphics

void LCDClearDisplay(int color); - clears the display

void LCDDrawChar(unsigned row, unsigned col, int8_t c); - draws a character to the LCD
```

```
void PrintString(char *str, int row, int col); - prints string to the LCD

void drawLines(); - draw the lines for the road and the icon

void drawOverR(unsigned x); - draws over the icon when moving right

void drawOverL(unsigned x); - draws over the icon when moving left

void drawOverObstacle(unsigned y, int obstacleX); - draws over the obstacle as it
travels down screen

void drawIcon(int obstacleXPos); - draws the obstacles

void drawIconBack(int obstacleXPos); - when coming back from pause, draws the icon

void drawObstaclesBack(bool obstacle1, bool obstacle2, bool obstacle3, int xPos1, int
yPos1, int xPos2, int yPos2, int xPos3, int yPos3); - when coming back from pause,
draws the obstacles
```

Section 4: Bonus Functionalities

I added the 4 lane bonus functionality by increasing the lane width and add another random spawn point for the obstacles.