Rally-Owl

Overview of Rally-Owl Game

- This game is based off of Rally-X
- The goal of the game is to collect all 10 flags before losing all your lives
- The game makes use of a horizontally and vertically scrolling map
- This game implements a mini-map

Key Parts of the Project

VGA CONTROLLER
Mainmap
-Player
-Smoke (3)
-Enemy Cars (3)
-Flags (10)
-Game Map

Mini-map
-Player
-Enemy Cars (3)
-Flags (10)
-uses a function to rescale these the mainmap

Software
- Calculate the score
- Set flag coordinates
- Set smoke coordinates
- Enemy car movement
- Enemy AI
- Fuel timer
- Player stutus (lives, direction)

VGA Controller

- Store all sprites in here
- Sprites are displayed by pixel
- Use rectangles to partition the screen
- Partition the screen in to a main game area and side bar
- Layer Priority
  - (MM) Player
  - (MM) Smoke
  - (MM) Enemy1 --> Enemy2 --> Enemy3
  - (MM)Map
  - (SB) "Score", " Lives", "Fuel", score, lives, fuel
  - (SB) Mini-map
- Syncing done at EndOfField
  - Key syncing issues
    - player and enemy movement
    - these are done per pixel and are fast movements

Memory Mapping

- Everything was written as 32bit data
- Address was 5bits
- We used 10 addresses
- **Adresss #Data (32 bits)**
- 0 - "00000"Map X (bits 0-15), Map Y (bits 16-31) **[Map X,Y pixel shift coordinates]**
- 1 - "00001"Player Direction (bits 0-2) **[Player's movement direction]**
- 2 - "00010"Fuel Status (bits 0-31) **[Fuel Gauge Amount]**

3 - "00011"Ones Place (bits 0-3), Tens Place (bits 4-7), Hundreds Place (bits 8-11) **[Player's Score]**

- 4 - "00100"Flag Col (bits 0-11), Flag Row (bits 12-23), Flag On/Off (bit 24), Flag # (bit 25-28) **[Flag data]**
- 5 - "00101"X (bits 0-11), Y (bits 12-23), Movement Direction (bits 24-26), Enemy On/Off (bit 27) **[Enemy 1 Data]**
- 6 - "00110"X (bits 0-11), Y (bits 12-23), Movement Direction (bits 24-26), Enemy On/Off (bit 27) **[Enemy 2 Data]**
- 7 - "00111"X (bits 0-11), Y (bits 12-23), Movement Direction (bits 24-26), Enemy On/Off (bit 27) **[Enemy 3 Data]**
- 8 - "01000"Smoke Col (bits 0-11), Smoke Row (bits 12-23), Smoke On/Off (bit 24), Smoke # (bit 25-28) **[Smoke data]**
- 9 - "01001"Lives (bits 0-31) **[Player's Number of Lives Left]**
- 10 - "01010"Game State (bits 0-31) **[0 - "Start", 1 - "End", 2 - "Play"]**

Software

- A master reset Key "R" to restart the game at any time
- Press S to start the game everytime player die
- If a enemy car run into a smoke, it will stop until the smoke disappear.
- Each time player uses a smoke, it takes some fuels of its fuel gague.
- If the player run into the enemy or the run out of fuel, the player dies.

Software (con't)

- Player Car
  - Get the direction from user
  - Detect the wall
  - When the car hit the wall, software change the direction to counter clockwise.

- Enemy Car
  - Software decide the direction according to the location of player car
    - verital and horizantal distance