Labyrinth

“Get in the Maze”

6.111 Final Project

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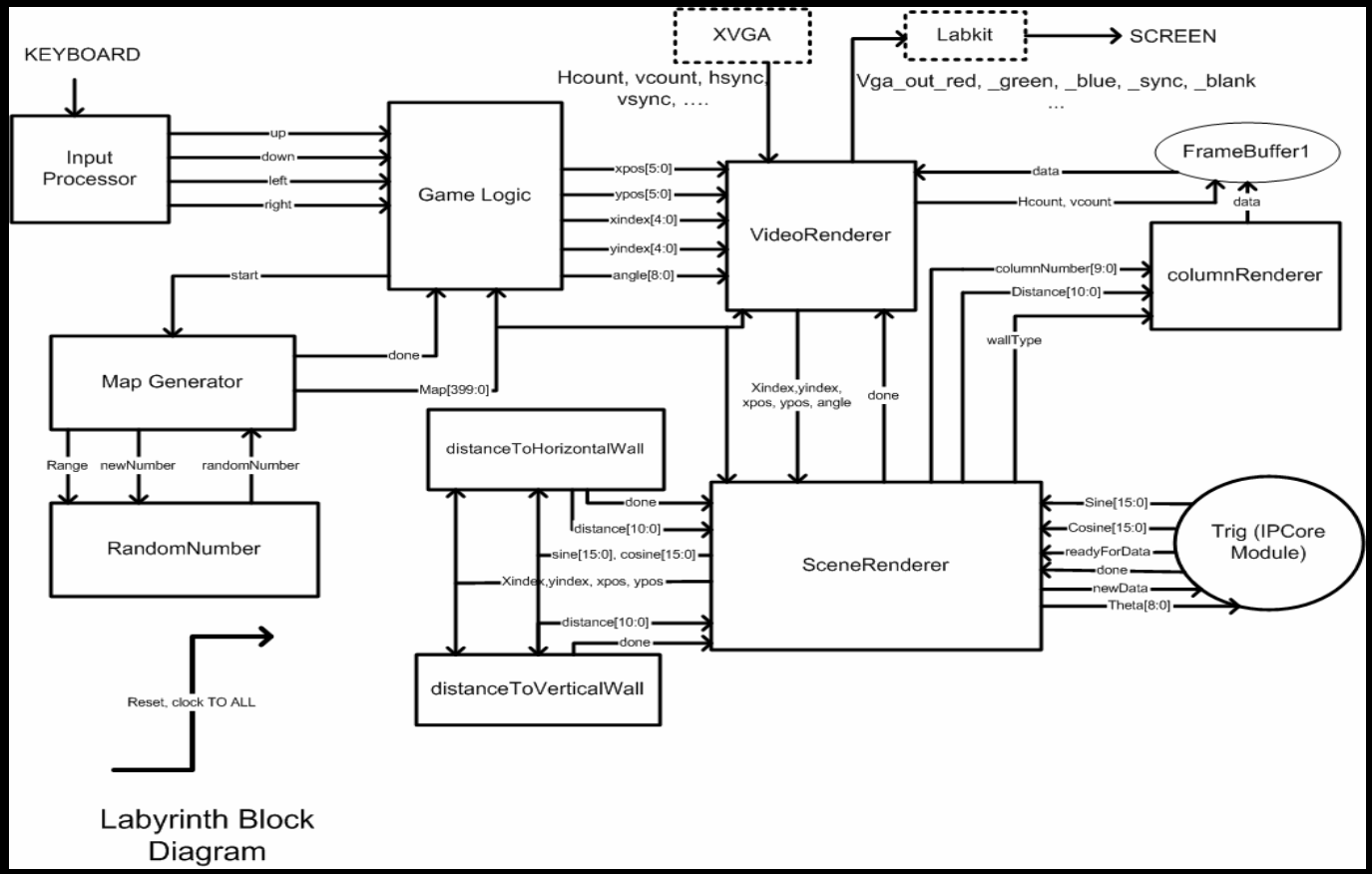
Description

- Players are trapped inside a maze and must navigate to the center
- Players can only see what is in front of them (in a 3D view) and a mini-map showing their general location
- Players can move forward/back and turn left/right

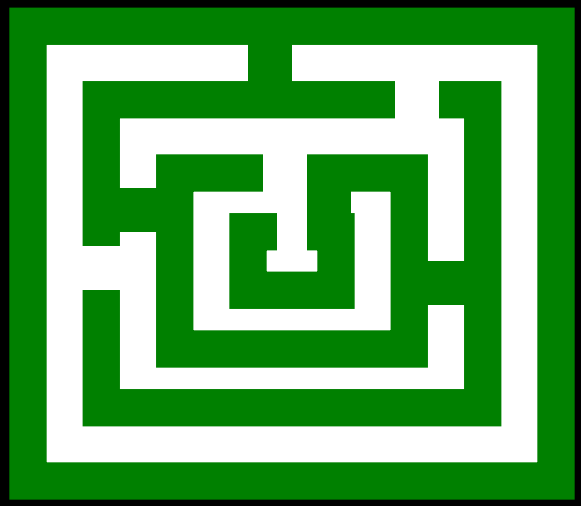
Block Diagram



Labyrinth Block Diagram

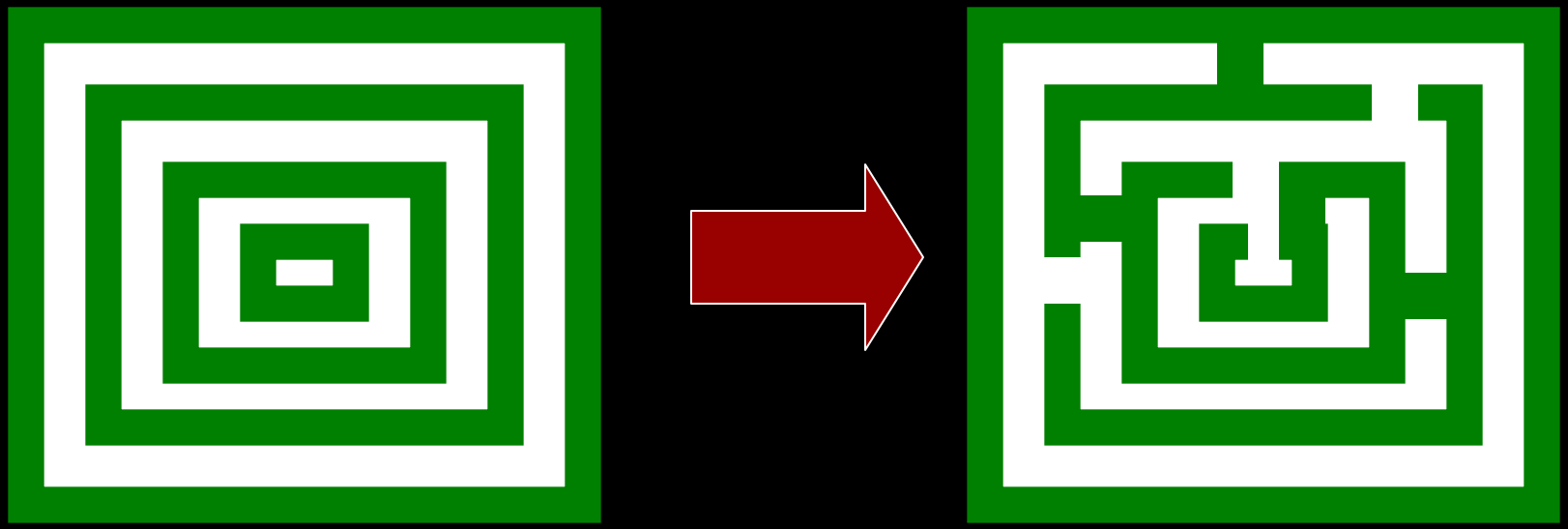
Maps are Randomly Generated

- A new random map is generated for every new game
- Players are presented with a new challenge every time they play
- Another layer of complexity



Map Generation

- Start every map with concentric squares
- Add/Remove walls to create maze



Map Generation

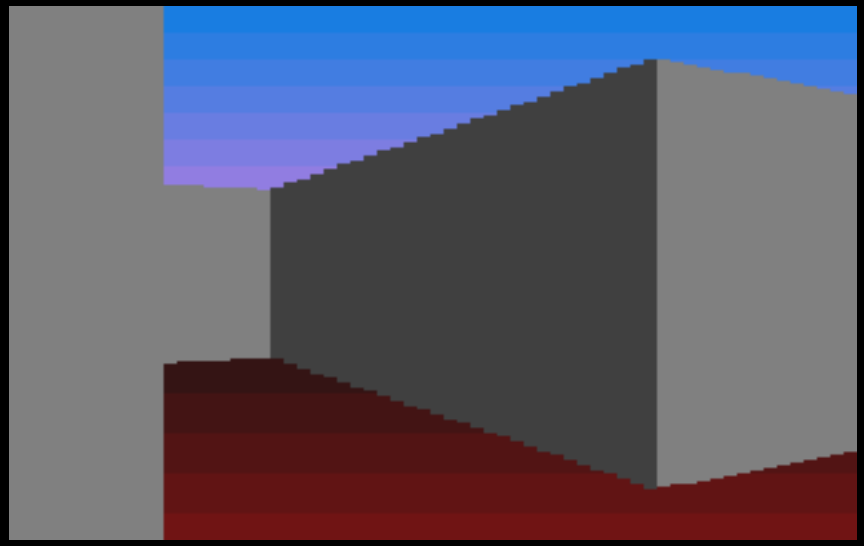
- Use random number generator module to choose which walls to add or remove
- After adding a wall make sure some set of invariants are never broken
  - At least 1 path to everywhere on the map
  - Limited number of paths to center of map

Game Logic

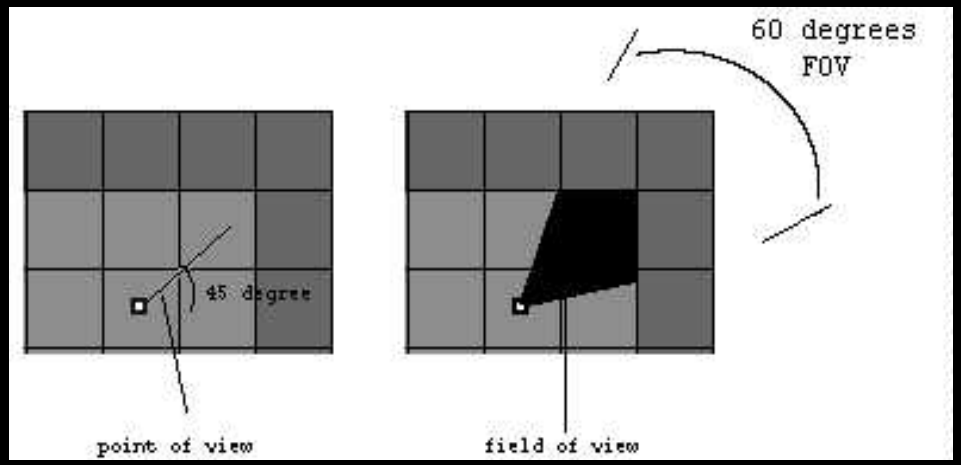
- Take as input up/down/left/right keys
- Update position if the move is possible according to the map (prevent player from walking through walls)
- Output the current position of the player and the player's viewing angle

Video

- Present the players a 3D view of the world



Ray Casting to Simulate 3D



- For every angle, find out how far the nearest wall is, and scale based on that distance
- Currently, each player has a 60 degree field of view, but depending on speed after testing, this might be adjusted

Writing Columns to Memory

- SceneRenderer outputs a distance and column number to ColumnRenderer
- ColumnRenderer scales the specified column and writes it to the video buffer

Double Buffering

- The monitor shows one buffer while the other buffer is being written
- Once SceneRenderer says a new frame is ready, the video switches to the other buffer

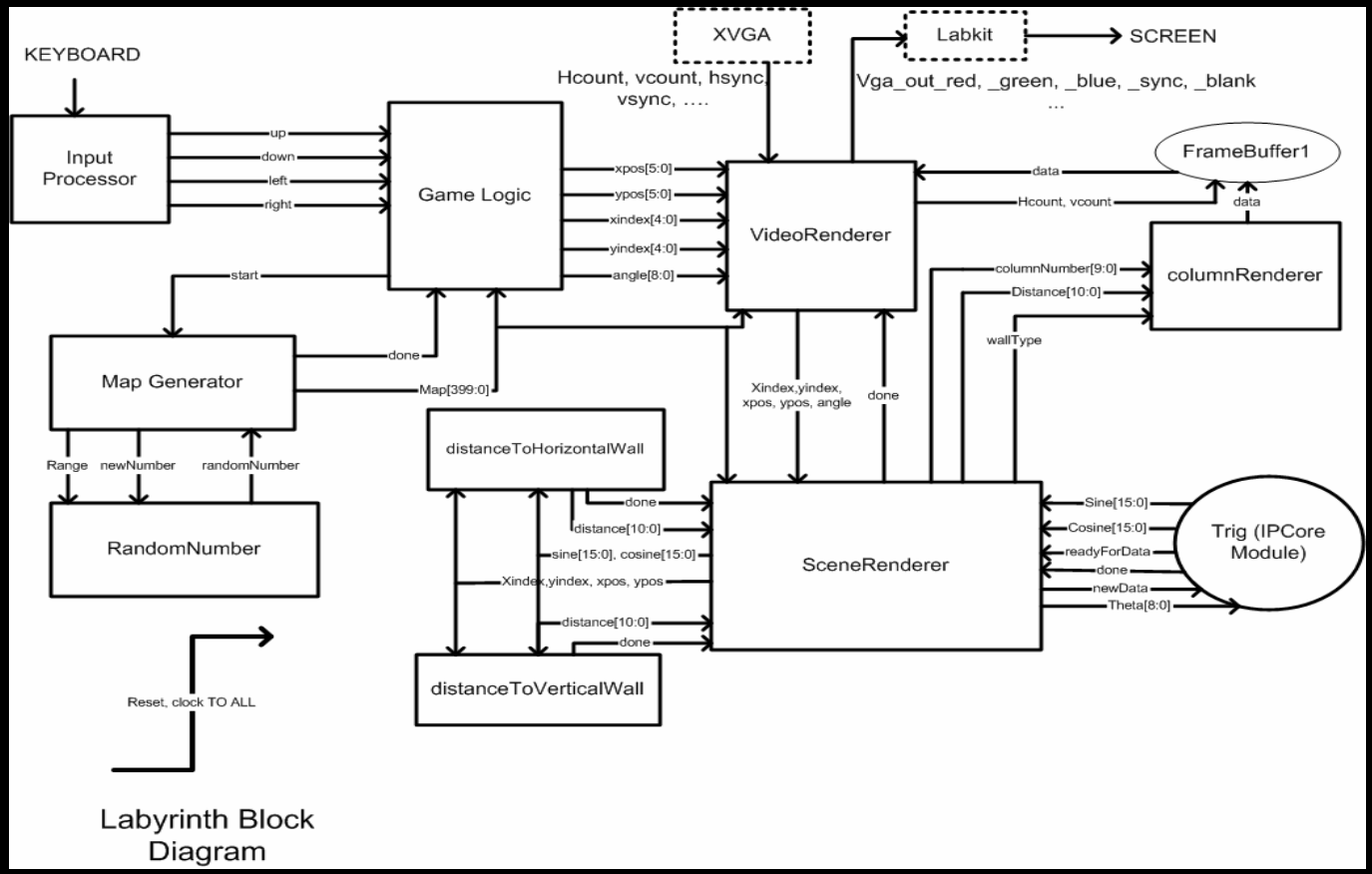
Timeline

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24 / 31	25	26	27	28	29	30

- November 20th
  - SceneRenderer outputting correct distance for every angle
  - Random Number Generator and initial map generator complete
- November 27th
  - ColumnGenerator writing columns to memory
  - MapGenerator complete
  - Initial Collision Detection
- December 4th
  - All subsystems working separately
- December 8th
  - Everything working together

Any Questions?



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