Extra credit
(worth 10pts equivalent in a midterm)

Design the robotic ant’s brain with virtual maze representation
- Due last day in class, Friday, December 5; printouts only
- Graded on clarity and completeness of explanation
- No questions will be answered, no late submission accepted

The maze

- Virtual maze
  - 128 × 128 grid
    - Stored in memory
    - 16384 8-bit words
  - XY is maze addresses
    - X is the ant’s horizontal position (7 bits)
    - Y is the ant’s vertical position (7 bits)
  - Each memory location says
    - 00000001 = No wall
    - 00000010 = North wall
    - 00000100 = West wall
    - 00001000 = South wall
    - 00010000 = East wall
    - 00100000 = Exit

Can have multiple walls
Example: 00001100
⇒ Walls on South and East
Design of different components

Predesigned:

Ant-Brain FSM

- Forward
- Turn right
- Turn left

SRAM

- Maze
- Data

Submit the designs for:

Forward
East
West
Preload
Forward
North
South
Preload

X counter

SRAM Address

Y counter

Antennae logic

- L
- R

Heading (shift register)

- North
- South
- East
- West

CSE370, Lecture 23

Recommendations

- Memory controller
  - Move horizontally: Increment or decrement X
  - Move vertically: Increment or decrement Y

- Shift register for heading
  - N: 0001
  - W: 0010
  - S: 0100
  - E: 1000
  - Rotate right when ant turns right
  - Rotate left when ant turns left

- Combinational logic for antennae logic