Project 1 Discussion

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1 Administrivia

Announcements

Assignment

Re-read Chapter 2.

From Last Time

OpenGL API.

Outline

1. Project 1 discussion.

Coming Up

2-D graphics and OpenGL lab.

2 Project 1

2.1 World/Window Coordinates

1. Let cell size be 1.0×1.0.

2. Use a one cell wide border around the maze. Special encoding to indicate these cells?

   Orthogonal projection; viewing volume.

3. Use a 500×500 window.

2.2 Cell Data Structure

1. Maze is 2-D array of cells. Max maze: 100×100.

   Entrance lower-left, exit upper-right.

2. Needed for each cell: visited; north, south, east, west walls up.

   Redundancy: remove.

   Draw south, west maze walls.

3. `struct` declaration:

```
typedef struct cell
{
    int visited;
    int north;
    int east;
} cell;
```

2.3 Sketch of `main()`

```
cell maze[ROWS][COLS];

main(...)
```

```
{
   process args;

   set-up window;
   set-up world;

   initialize maze and seed random number generator;

   /* Create a random maze. */
   visit(start cell);

   /* Exit on mouse click. */
   register MouseFunc;

   /* On re-display clear window, redraw maze, re-compute
    *   and display path.
    */
   register DisplayFunc;

   /* IdleFunc unused!!! */

   /* "Prime the pump." */
   post a redisplay event;

   enter MainLoop;
}
```

2.4 visit() Pseudo-Code

```
visit(current cell)
{
   mark current cell visited;

   start = a random compass direction;

   for each of the four compass directions clockwise from start
      if new cell exists and is unvisited
      {
         remove appropriate wall;
         visit(new cell);
      }
}
```

2.5 `path()` Pseudo-Code

Idea: Get a sequence of cells from start cell to end cell on the call stack and draw path from end to start.

Don't forget to mark all maze cells as unvisited before first call!

Initial call: `path(start cell, end cell);`

```
path(current cell, target cell)
{
   mark current cell visited;

   if current cell == target cell
      return 1;

   for each of the four neighbor cells
      if new cell exists and is unvisited
         if (path(new cell, target cell))
         {
            draw segment from current cell to new cell;
            return 1;
         }

   return 0;
}
```

2.6 A Sample Maze

Need to draw entry/exit segments. Use two colors. 4×4 maze:

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