CSSE 220 Day 10

Two-dimensional arrays, Array Copying, Software Engineering Techniques

Check out *TwoDArrays* from SVN

Questions?

Exam Coming!

- Test next Wednesday
- **Can start at 7:30 if you want extra time**
- Topics from Ch. 1–7
- Will include:
  - A paper part—logic, short answer, fill-in-the-blank
  - A programming part—a few small programs, unit tests provided
- Review in class Monday
  - Bring questions
  - I won’t anything prepared but am happy to cover whatever you want, including working examples

Q1

Two Dimensional Arrays

- Consider:

  ```
  final int ROWS = 3;
  final int COLUMNS = 3;
  String[][] board = new String[ROW][COLUMNS];
  ```

- What’s the value of **board[1][2]** now?
- Need to fill the 2-d array:

  ```
  for (int r=0; r < ROWS; r++) {
      for (int c=0; c < COLUMNS; c++) {
          board[r][c] = “ ”;
      }
  }
  ```

Q2

Exercise

- Complete the TODO items in TicTacToe and TicTacToeTest

  They’re numbered; do ‘em in order.

Copying Arrays

- Assignment uses reference values:

  -
    ```
    double[] data = new double[4];
    for (int i=0; i < data.length; i++) {
        data[i] = i * i;
    }
    double[] pieces = data;
    ```
- Can copy whole arrays:

  -
    ```
    double[] pizzas = (double []) data.clone();
    ```

All objects have a clone() method. Its return type is Object, so we have to cast it.

Q3–6

Copying Part of an Array

- Use built-in function:

  -
    ```
    System.arraycopy(fromArray,fromStart,
                     toArray,toStart,count);
    ```
- Copies
  - **count** values from **fromArray**,
  - beginning at index **fromStart**,
  - copying into array **toArray**,
  - beginning at index **toStart**

Q7

Quality Tip

- “Avoid parallel arrays”
- We did this in ElectionSimulator
- Instead of storing:

  -
    ```
    ArrayList<String> stateNames;
    ArrayList<Integer> electoralVotes;
    ArrayList<Double> candidateAOdds;
    ArrayList<Double> candidateBOdds;
    ```
- We used:

  -
    ```
    ArrayList<State> states;
    ```
    and put the 4 pieces of data inside a State object
- Why bother?

Q8

Pick the Right Data Structure

- Array or ArrayList, that is the question

- General rule: use ArrayList

- Exceptions:
  - Lots of primitive data in time critical code
  - Two (or more) dimensional arrays

Q9

Software Engineering Techniques

- Regression testing
- Pair programming
- Team version control

Regression Testing

- Keep and run old test cases

- Create test cases for new bugs
  - Like antibodies, the keep a bug from coming back

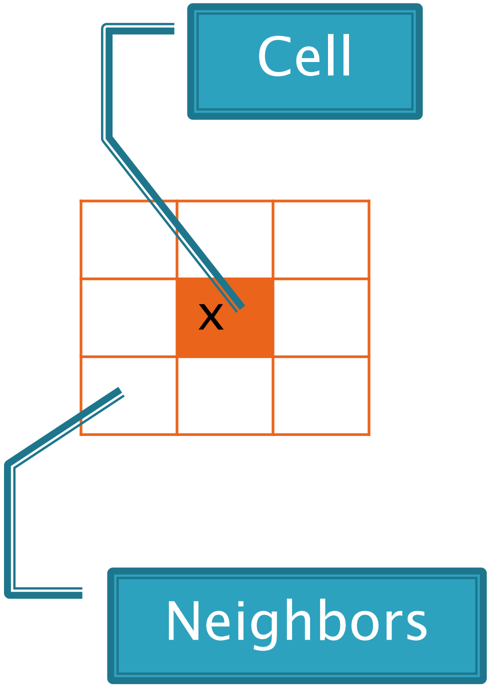
- Remember:
  - You can right-click the project in Eclipse to run all the unit tests

Pair Programming

- Video

Game of Life

1. A new cell is born on an empty square if it has exactly 3 neighbor cells
2. A cell dies of overcrowding if it is surrounded by 4 or more neighbor cells
3. A cells dies of loneliness if it has just 0 or 1 neighbor cells



Team Version Control

- **Always**:
  - **Update before** working
  - **Update again** before committing
  - **Commit often** and with good messages

- **Communicate** with teammates so you don’t edit the same code simultaneously
  - Pair programming eliminates this issue

Game of Life Teams

n	
1	Jasmine and Andrew M.
2	Andrew C. and Jesse
3	Kenton and Matthew
4	Colin and Patrick
5	Ted and Trenton

Team number used in homework description