

ITEC 120

Lecture 20
2D-Arrays

Review

- Exam
- Sound on computers

2D Arrays

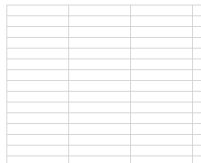
Objectives

- Expand on arrays
- Motivation
- Syntax
- Usage scenarios

2D Arrays

Arrays

- One dimensional
 - Rulers
 - Lists
- Two dimensional
 - Charts
 - Grids
- Three dimensional
 - Cubes
 - Points in 3 space



2D Arrays

Row / Column

- With arrays you have currently been working on columns
- Moving to two dimensions
 - Still start at 0

```
int[][] x = new int[2][2];
int row=0;
int col=0;
x[row][col] = 3;
```

0,0	0,1
1,0	1,1

2D Arrays

Array Teacher

- Visualization demo

2D Arrays

Walking

- 2 people walking
- One stops, other walks perpendicular
- Work on rows, then columns

```
for (int i=0; i<array.length; i++) ← Row walker
{
  for (int j=0; j<array[i].length; j++) ← Column walker
  {
    System.out.println(array[i][j]);
  }
}
```

2D Arrays

Find min

- Old

```
int min= array[0];
for (int i=0; i<array.length; i++)
{
  if (array[i] < min)
    min = array[i];
}
```

- New

```
int min= array[0][0];
for (int i=0; i<array.length; i++)
{
  for (int j=0; j<array[i].length; j++)
  {
    if (array[i][j] < min)
      min = array[i][j];
  }
}
```

2D Arrays

Sum

- Old

```
int sum= 0;
for (int i=0; i<array.length; i++)
{
    sum = sum + array[i];
}
```

- New

```
int sum= 0;
for (int i=0; i<array.length; i++)
{
    for (int j=0; j<array[i].length; j++)
    {
        sum = sum + array[i][j];
    }
}
```

2D Arrays

Copying

- Create new array

```
int[][] newArray = new int[oldArray.length][oldArray[0].length];
```

- Walk and copy

```
for (int i=0; i<newArray.length; i++)
{
    for (int j=0; j<newArray[i].length; j++)
    {
        newArray[i][j] = oldArray[i][j];
    }
}
```

2D Arrays

Game of life

- 2D Grid
- Look at life around you
- If you have > 3 neighbors, die of overcrowding
- If you have < 2 neighbors, die of loneliness
- If you are surrounded by 3 neighbors, create
- Case study

2D Arrays