

CS 180 Problem Solving and Object Oriented Programming

Fall 2011

<http://www.cs.purdue.edu/homes/apm/courses/CS180Fall2011/>

This Week:

Notes for Week 8:

Oct 10-14, 2011

10/11 October break [No class]

- 10/13
1. Arrays and loops [again]
 2. Arrays: multidimensional
 3. Methods
 4. Creating GUIs

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Readings and Exercises for Week 8

Readings:

1. Review [Strings](#) and various methods
2. Arrays: 6.6, 6.7.1
3. GUI: 12.2, 12.3

Exercises:

6.9, 6.13

Project 3

Team project
Start today!

Special class

Sunday October 17: 4-5:30pm
LWSN 3102AB

For those who have not been able to perform well on Exam 1 and/or Project 1/2.

Send me email if you wish to attend. Bring your laptops.

Lunch meeting

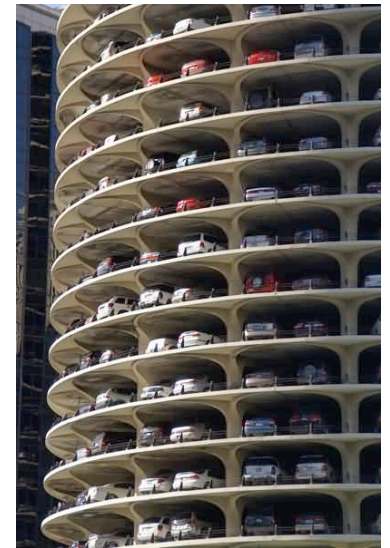
When: Thursday October 14, 2010. Noon-1:30pm

Where: Ford Dining Hall

Meet: Upstairs in the Ford dining hall

Attendees: All who signed up but have not yet
attended a lunch meeting

Look forward to seeing you!



Arrays: More of them

[FreeFoto.com]

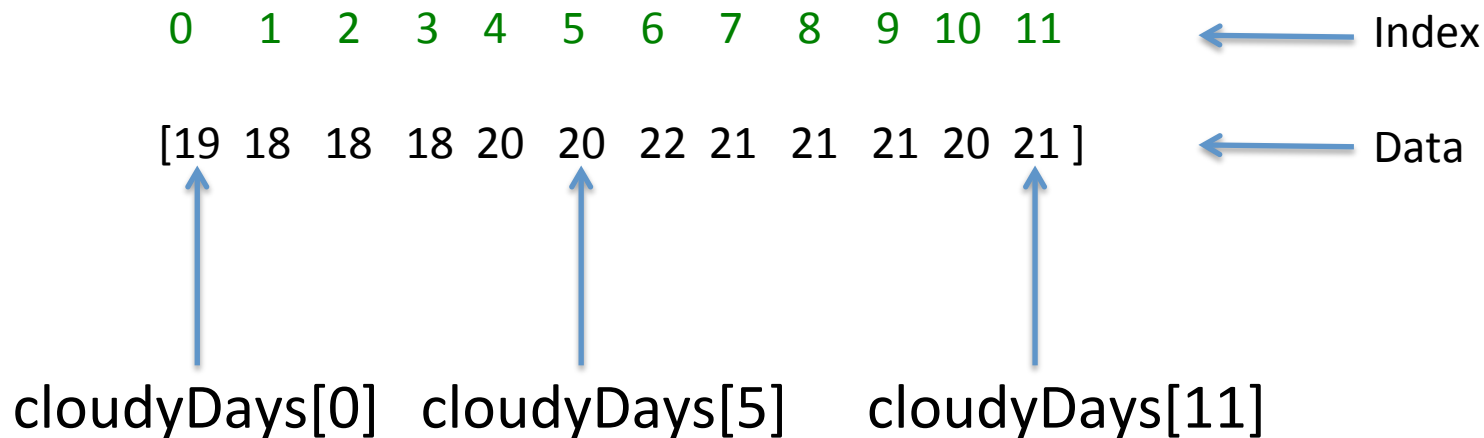


Arrays: Visual representation

Single dimensional array: Example 1

```
int [] cloudyDays=new int [12]; // average cloudy days/month
```

Anchorage, Alaska



Single dimensional array: Example 2: Declaration

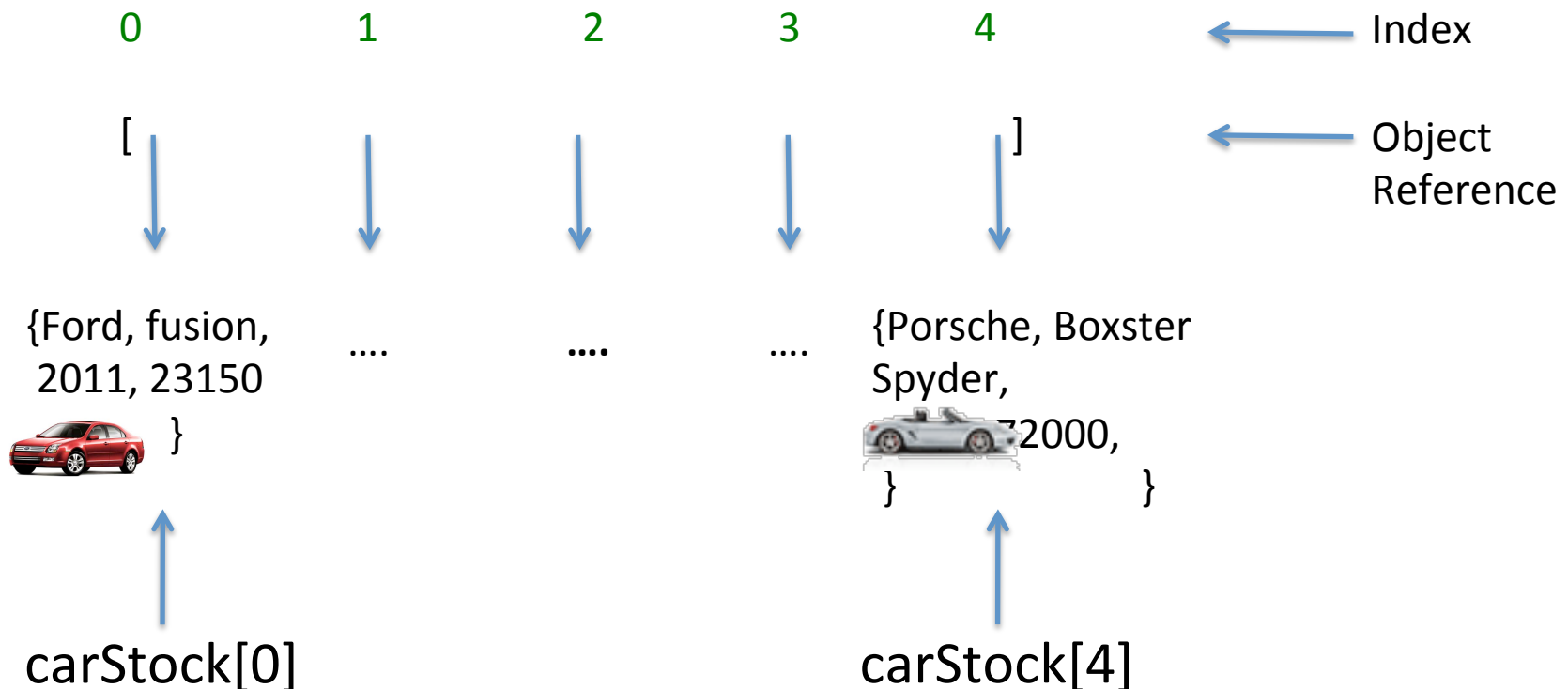
```
Car [] carStock=new Car [5]; // Cars at a dealership
```

```
public class Car{  
    String make; // e.g. Ford  
    String model; // e.g. Fusion  
    int year; // e.g. 2011  
    long msrp; // e.g. US$23145  
    Picture carPic;  
}
```

Single dimensional array: Example 2: Visual

`Car [] carStock=new Car[5]; // Cars at a dealership`

CS180 Dealership in West Lafayette



Arrays: Multidimensional

Example 1

MEAN MONTHLY CLOUDY DAYS IN ARIZONA

		0	1	2	3	4	5	6	7	8	9	10	11
		J	F	M	A	M	J	J	A	S	O	N	D
FLAGSTAFF	0	12	11	12	9	7	4	9	8	5	7	8	11
PHOENIX	1	10	9	8	6	3	2	4	4	3	4	6	9
TUCSON	2	10	9	9	6	4	3	9	7	4	5	6	10
WINSLOW	3	12	10	9	7	5	4	8	6	4	6	8	10
YUMA	4	9	6	6	4	2	1	3	3	2	3	5	8

rows columns

`int [][] cloudyDays=new int [5][12];`

What is the value of cloudyDays[1,8]?

Declaration

```
Cars [] inventory=new Car [3][];
```

3 rows and undefined number of columns

Each row represents the make of a car and
column represents the models

		0	1	2	
0	Chevy	Avalanche	Traverse		← Only two columns
1	Honda	Accord	Fit	Civic	
2	Toyota	Camry	Corolla	Rav4	

Length of an array

```
Book [][] b=new Book[30][];
```

Number of rows can be found using the **length** attribute.

```
int rows=b.length; // number of rows
```

Number of columns is found for each row. For example,

```
int col=b[2].length;
```

Gives us the number of columns in row with index 2.

Recall: Number of columns can be different for each row.

Problem-1

Write a method named `initData()` that performs the following tasks:

1. Inputs two integers `n` and `m`
2. Creates an array of integers containing `n` rows and `m` columns
3. Initializes all elements of the array to 1

Solution

```
int [ ][ ] a; // Declare a as a two-dimensional array
public void initData(){
    Scanner in=new Scanner(System.in);
    int n=in.nextInt(); // Get number of rows
    int m=in.nextInt(); // Get number of columns
    a=new int[n][m];
    for (int i=0; i<n; i++){ // Iterate across all rows
        for (int j=0; j<m; j++){// Iterate across all columns
            a[i][j]=1; // initialize an element
        }
    }
}
```


Problem-2

Write a method named `findMax()` that takes a two dimensional array of integers as `input` and

1. Finds the maximum value in the array
2. `Returns` the maximum

Solution

```
public int findMax(int a[][]){  
    int max=Integer.MIN_VALUE;  
    int n=a.length, m=a[0].length;  
    for (int i=0; i<n; i++){ // Iterate across all rows  
        for (int j=0; j<m; j++){ // Iterate across all columns  
            if(max<a[i][j]){  
                max=a[i][j];  
            }  
        }  
    }  
    return (max);  
}
```

Arrays: Typical runtime errors:

Index Out of bounds

```
int [] a=new int [10];
```

```
a[i]=x; // i is greater than 9 or less than 0
```

- Element not initialized [Compile time error]

```
String [] name;
```

```
name[i]="Bob"; // element not initialized
```

Arrays: Typical compile time error: Element not initialized

```
String [] name;
```

```
name[i]="Bob"; // element not initialized
```

```
String [] name;
```

```
name=new String[5];
```

```
name[i]="Bob"; // Now OK if i is in range
```

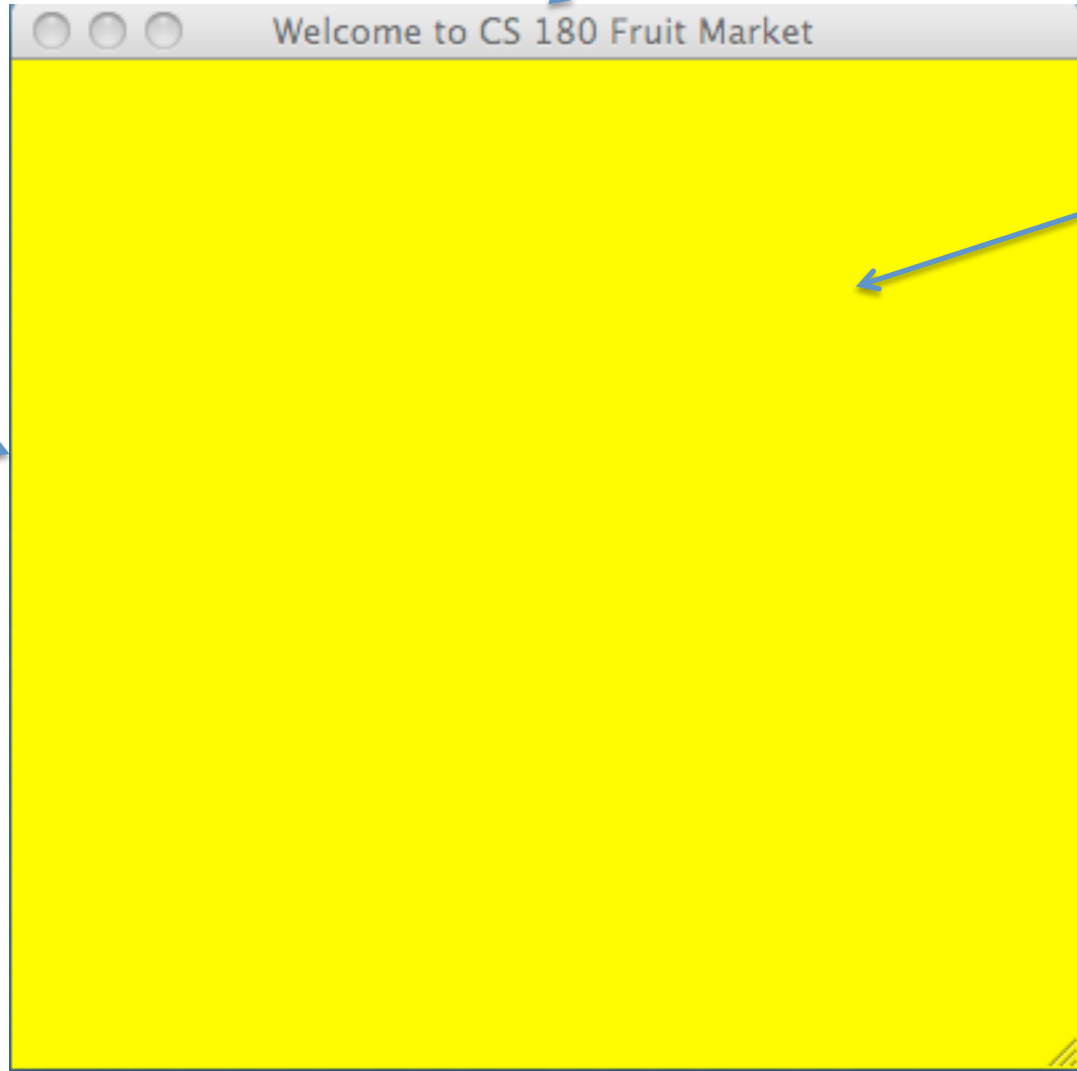
Graphical User Interfaces

A simple GUI: Frame

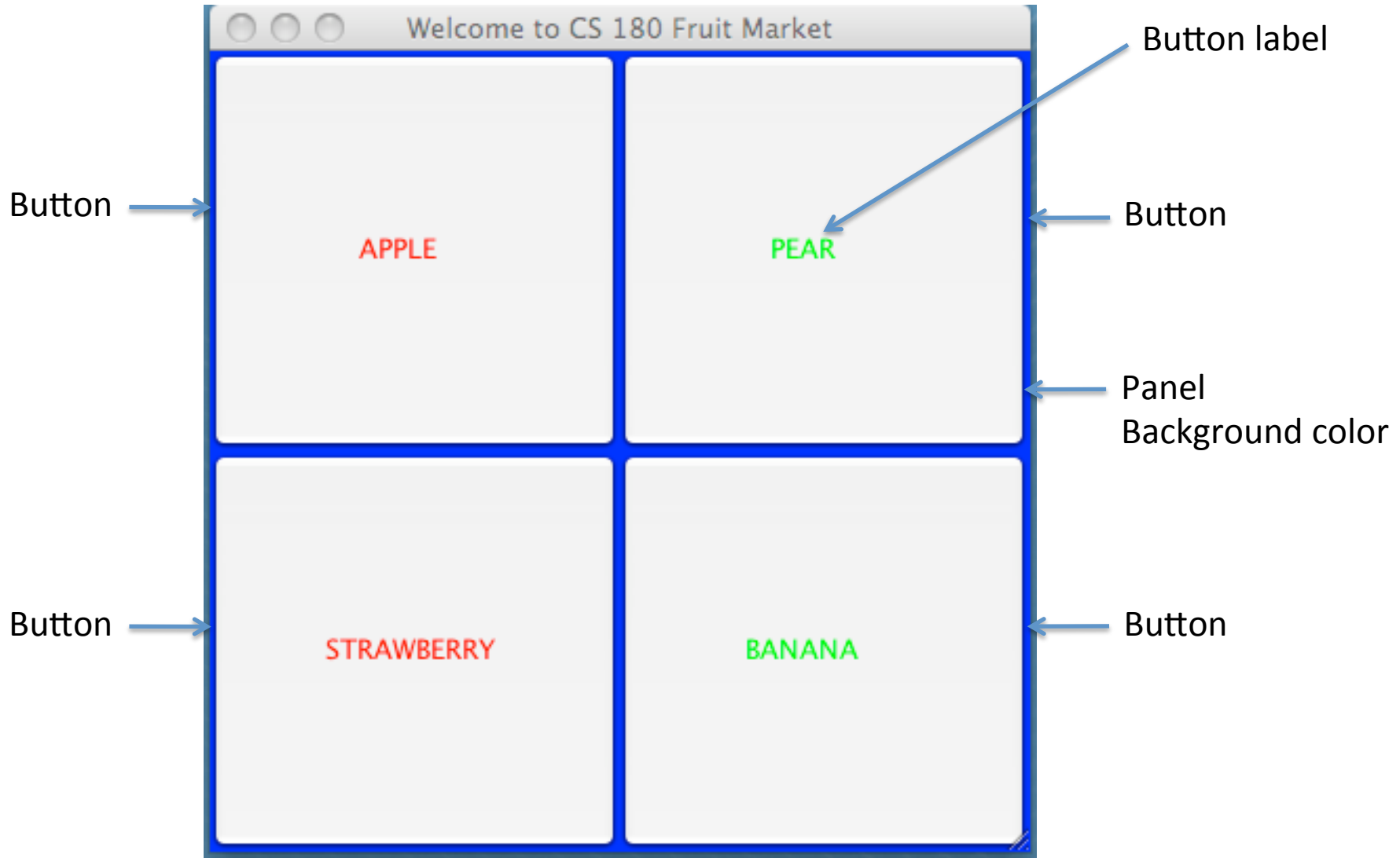
Title

Border

Color



A simple GUI: Frame with a Panel and Four Buttons



Live demo

Week 8: October 11-15, 2010
Hope you enjoyed this week!

Questions?

Contact your recitation instructor. Make
full use of our office hours.