

# CSE 142 Programming I

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## Arrays & Structures

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P-1

## When Data Structures Collide

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- What happens when we start mixing our newly found friends: arrays and structs?
- Many possibilities:
  - Structs in arrays
  - Arrays in structs
  - Structs in arrays in structs in arrays in arrays in structs in structs in arrays...

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P-2

## Recall This Struct

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```
typedef struct {  
    int x, y;  
} point;
```

- We may want an array of points...

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P-3

## Arrays of Structs

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- Let's say we wish to keep track of many points:

```
/* an array of 10 points */  
point data[10];
```

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P-4

## Using this Data:

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- We can access the field in one of these points by using
  - Array subscripts
  - The dot (.) operator

```
data[4].x = 3;
```

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P-5

## Type Check!

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- What are the types of:

```
data
```

```
data[3]
```

```
data[3].y
```

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P-6

## Passing Arrays of Structs

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- We pass arrays of structs exactly like we passed arrays of other basic types:
- Example: Find the centroid of a bunch of masses

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P-7

## Find the Centroid

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```
typedef struct{
    double x, y;
    double mass;
} object;

object centroid(object a[], int
    numObjects);
```

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P-8

## Putting Arrays in Structs

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- We can put arrays in structs as well!  
(Actually, we've seen this already)

```
typedef struct {
    char name[100];
    int idnum;
} student;
```

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P-9

## Structs With Arrays

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- When an array is passed to a function it is not copied
- When an array is inside of a struct, and is passed to a function it **IS** copied
  - The struct is copied, and since the array is inside of it, it gets copied as well

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P-10

## Searching The Phonebook

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```
typedef PEntry{
    char name[100];
    char phoneNumber;
    int zipCode;
} PEntry;

PEntry locate(PEntry a[], char
    name[]);
```

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P-11