Lecture 14:
Structs

CSE 29: Systems Programming and Software Tools
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CSE
UCSD

Introducing struct datatypes

- Up until now all variables have been ether single elements or arrays

  int latitude;

  int longitude;

- struct is a datatype that can combine elements into one variable

  struct place {
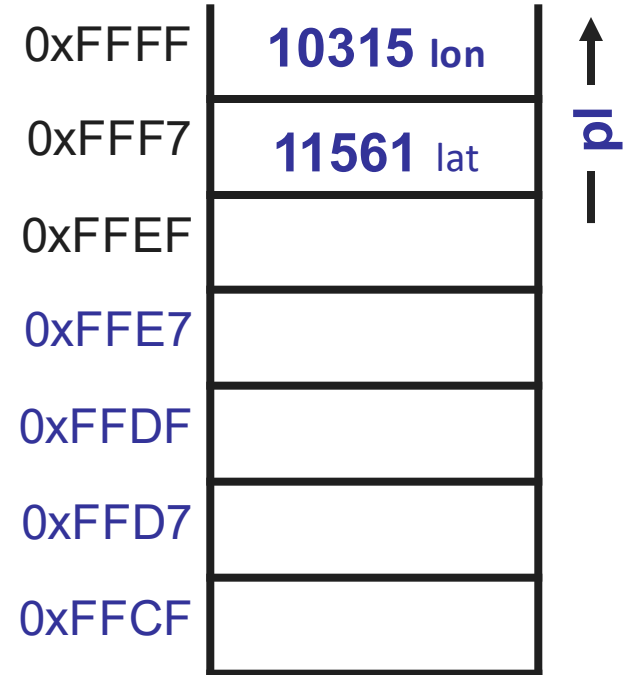
      int latitude;

      int longitude;

  };

  Data members (or member variables)

Using struct datatypes

```
struct place {
    long int lat; // Latitude
    long int lon; // Longitude
    char name[64]; // Name
};

int main() {
 struct place pl;
 pl.lat = 10315;
 pl.lon = 11561;
 return 0;
}
```

Address	Value	
0xFFFF	**10315** lon	
0xFFF7	**11561** lat	
0xFFEF		
0xFFE7		
0xFFDF		
0xFFD7		
0xFFCF		

pl

stack

Passing a struct to a function

```
long int distance(struct place p1, struct place p2) {
    // Compute the distance from p1 to p2
    return ((p1.lat – p2.lat)**2); // not actual distance
}


int main() {
  struct place dca = {389072, -770369};
  struct place san = {327157, -1171611};
  long int dist = distance(dca, san); // structs will be copied ☹
}                            // now two copies on stack
```

Passing a struct to a function as a ptr

```
long int distance(struct place* p1, struct place* p2) {
    // Compute the distance from p1 to p2
    return ((p1->lat – p2->lat)**2); // not actual distance
}


int main() {
  struct place dca = {389072, -770369};
  struct place san = {327157, -1171611};
  long int dist = distance(&dca, &san); // one copy only!
```