CSC209 Week 6 Notes

Hyungmo Gu

May 14, 2020

Struct 1 of 3

- Introducing Structs
  - **struct/structures** is like dictionary in Python or object in Javascript
  - there are differences between array and structure

	array	structure
data of same type	yes	not required
declaration details	type and number of elements (array [] notation)	types of members (struct keyword)
access via ...	index notation	dot notation

  - items in struct is called **member**
  - items in array is called **element**

```c
#include <stdio.h>
#include <string.h>

int main() {
    struct student {
        char first_name[20];
        char last_name[20];
        int year;
        float gpa;
    };

    struct student good_student;
```

```c

    strcpy(good_student.first_name, "Jo");
    strcpy(good_student.last_name, "Smith");
    good_student.year = 2;
    good_student.gpa = 3.2;

    printf("Name: %s %s\n", good_student.first_name, good_student.last_name);
    printf("Year %d. GPA %.2f\n", good_student.year, good_student.gpa);

    return 0;
}

```

Listing 1: struct_example_1.c

Struct 2 of 3

- Using Structs in Functions
  - Array pass function by **reference** (of the pointer of first element).
    - Changing value inside affects outside
  - Struct pass function by **value** like int and string.
    - Changing value in function doesn't affect value outside
    - Pointer used to pass by **reference**

```c
#include <stdio.h>
#include <string.h>

struct student {
    ...
};

void change(struct student *s) { // <- passes by reference
    ...
};

int main(void) {
    struct student good_student;
    ...
    change(&good_student); // <- to pass function by reference (This is too cool!!!)
    ...
    return 0;
}

```

Listing 2: struct_example_2.c

Struct 3 of 3

- Pointer to Structs
  - *(*p).student_name* is hard to define, and read
  - *p->student_name* is the same as above, but easier to read.
    - This is called **syntactic sugar**

```c
#include <stdio.h>
#include <string.h>

struct student {
    char first_name[20];
    char last_name[20];
    int year;
    float gpa;

};

int main(void) {
    struct student s;
    struct student *p;

    ...

    (*p).gpa = 3.0;
    p->year = 3; //<- HERE!!

    strcpy(p->first_name, "Hello");

    ...
    return 0;
}

```

Listing 3: struct_example_3.c