Recitation 2

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Pointer Arithmetic

Suppose you are not familiar with your surroundings, but I ask you to bring me water. What kind of questions you want to ask me?

- Where?
- How much/many? (A cup? A bottle? Two bottles or more? A bucket? A tank?)

When you ask the system to get a value from the memory, the system would also ask you these questions:

- Where? (memory address)
- How much/many? (type of the variable)

Pointer Arithmetic

- Pointer Arithmetic
  - Do addition to a pointer is to move the pointer by the size of the type

Examples:

(1) int *a; a+1 // a+1 means a+sizeof(int)

(2) char *a; a+1; // move pointer by 1 byte

(3)
```
typedef struct s_type
{
    int *a;
    char *b;
}s_type;

s_type *s; s+1;          // move pointer by sizeof(s_type)
```

Pointer Arithmetic

HW 2:

Write some code that declares two arrays of size 10 that are string literals.

1. Make a pointer to one of the arrays, cast it to be an int pointer, and print out its value.
2. Make a new integer, set it equal to the value of your int pointer, then make a pointer to that integer, cast it to be a char pointer, and print out 8 chars.

What happened? Why?

Others (cont’d)

- Pointer Arithmetic
  - Play with the types: int a = 100; printf(“%c”, a) → What will you get?
  - int a = 97; printf(“%c”, a) → What will you get?
- Const pointer (some tricks)
  - Any difference between: int const *p and int *const p?
  - int const *p: You cannot change the content which p points to, but you can change where p points to.
  - int *const p: You cannot change where p points to, but you can change the content of p.
  - Which comes first which one is fixed!!

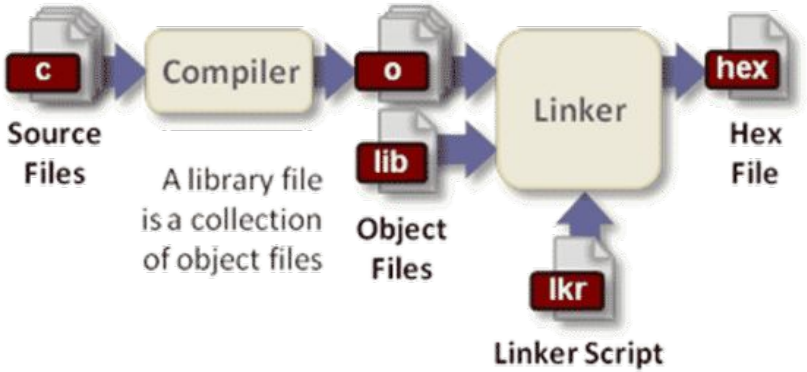
Compilation

What are the steps to compile your source code?

1. Configure
2. Locate standard library and header files
3. Source file dependency calculation
4. Preprocessing/Precompilation
5. Compilation
6. Object file dependency calculation
7. Linking

Compilation (cont'd)

- Precompilation/Preprocessing
  - Make preparations for compiling
- What is object file?
  - Computer readable code file
- What is linking?
  - Link all the object files to an executable



Useful URL: http://nethack4.org/blog/building-c.html

Others (cont’d)

Heap & stack (array and pointer)

- Is there any difference?
  - char str[3];
  - char *str = (char*)malloc(3*sizeof(char));

You can use index to get the specific element in both ways.

For the first definition, *str == str[0]

Others (cont’d)

- Difference between struct and union
- How to use typedef
  - Always used with struct define or enum, etc.
  - E.g.

```
typedef struct s {
        int a;
        char b;
}myType;
```

Don’t forget the “;” when you define a struct!!!!

Others

- A way to use typedef
  typedef char Line[20]; <==> char line[20];
  Line text, secondline; char line[20];

- A way to use boolean type in C
  typedef enum{false, true} bool;
  Or
  typedef int bool;
  #define true 1
  #define false 0

Any Questions??

HW 2

1. int i = 5;
   int *ip = &i;
   what is ip? What is its value?

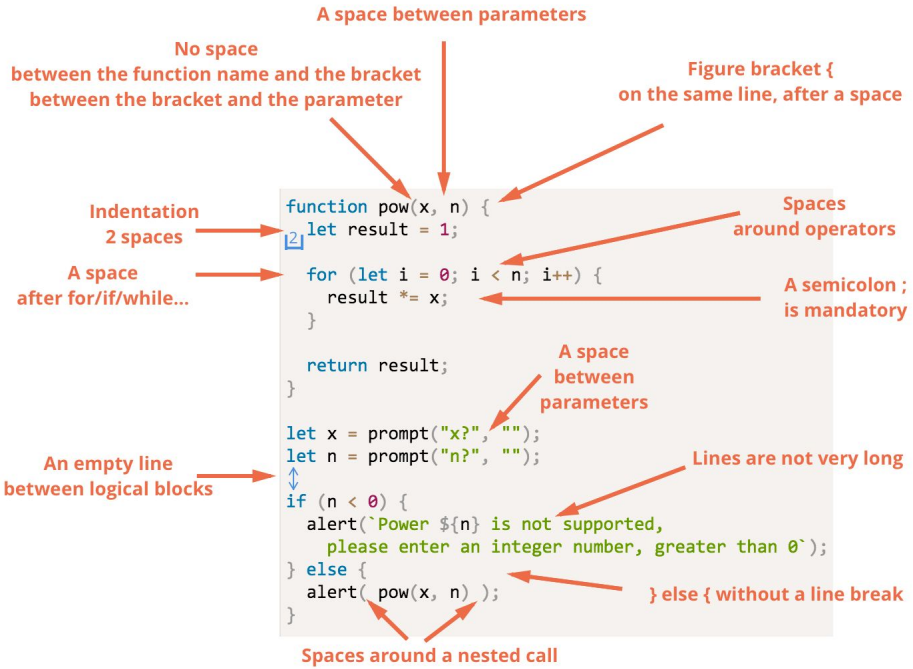
2. Write some code that declares two arrays of size 10 that are string literals.

- Create a pointer that points to the beginning of the first array, then in a loop, increment the pointer and print out the char it points to, out to index 20.
  What happened? Why?

Coding Style

- Naming Conventions
- Indentation
- Brace Style
- Commenting
- Code consistency
- Readability

Good code is readable and easy to be maintained



References

1. https://www.slideshare.net/systemcrashed/coding-conventions
2. https://javascript.info/coding-style