

C Programming

Course Basics

Instructor

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 - Semiconductor Bldg 400626
- TA
 - Sangwook Kim
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Lectures

- 1~2 hours lectures at 400212
- 2~3 hours lab at 400202

Course Materials

- Textbook

Kelley A., Pohl I, "[A Book on C: Programming in C](#)", Fourth Edition, Addison-Wesley, 1998, ISBN 0-201-18399-4.

<http://www.cs.ucsc.edu/~pohl/abc4.html>

- Course Web - tba

- Laboratory

- conducted by TA

- lectures and programming exercises

- Homeworks

- 5 individual homeworks

Academic Honesty

- All work submitted for credit must be your original ones.
- Cheating on lab or homework
 - “F” grade and a report to the Dean
- Cheating on examination
 - report to the president of SKKU
- No exception on dishonesty

All you have to know about computers for C programming

- Computers play with numbers only
 - everything is represented by numbers
 - pictures, numbers, music
 - binary: bit, byte, word, half word
- There are CPU and memory
 - disk, keyboard, screen, of course

intentional blank page

- You need a language to tell computers to do what you want

- Korean, English, ... natural languages are used by human

Find the 100th prime number

- very difficult for computers to understand

- binary numbers are used by computers

00001111 10111111 01000101 11111000
00001111 10111111 01001101 11111000

- very difficult for human to understand

- Programming Languages

- a language that describes what to do for a computer

- machine language

- binary
 - only an expert use it

- assembly language

- alphabet
 - most embedded system

- high-level language

- C, Java, C++, ...
 - most software

```
00001111 10111111 01000101 11111000
00001111 10111111 01001101 11111000
00000011 10100001
01100110 10001001 01000101 11111010
```

```
MOV AX, MIDSORE
MOV CX, FINALSORE
ADD AX CX
MOV TOTALSCORE, AX
```

```
TotalScore = MidScore + FinalScore;
```


An Introduction to C

- 1972: developed by Dennis Ritchie
 - to develop an OS(Unix) for PDP-11
 - small
 - efficient
- 1989: ANSI C
 - portable
- C99
 - by ISO
 - not by MS



C, C++, Java

- Java is safe and elegant, but slow
- C++ is unsafe and fast, also complex
- C is unsafe, but fast and simple
 - a small language (not many features)
 - portable
 - modular
 - basis for C++ and Java

Program Development Cycle

1. Requirement Analysis
2. Algorithm
3. Coding
4. Compile & Link
5. Execution & Debugging
6. Maintenance

Requirement

- A document that describes what should be done with your program
 - homework and lab assignment
- It should be as accurate as possible
 - e.g.) find employees with 3 years experiences
 - regular? temp?
 - 3 calendar years?

Algorithm

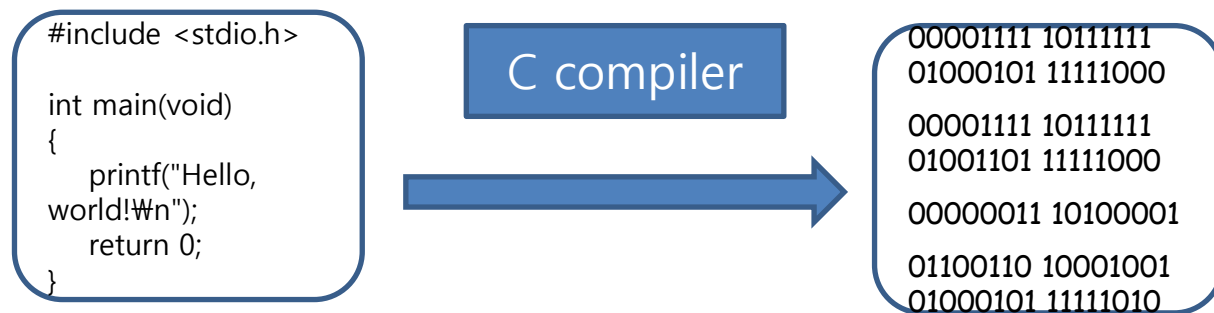
- A procedure for the solution
 - natural language
 - flow chart
 - pseudo code
- e.g.
 1. read one employee record
 2. if experience is longer than 3 years print name
 3. repeat step 1,2 until all employee records are read
- the most important step in programming

Coding

- choose a programming language
 - C, of course
- describe your algorithm using C
 - understand C grammar
 - understand C behaviour
- a program written in C is called **source program**
- coding is relatively simple task

Compile

- Remember computers understand only binary numbers
- A program in C should be translated into a machine language
 - this process is called **compile**
 - funny name!!
- Grammatical sanity is checked



Link

- Sometimes, your program is too large to fit in a single file
 - you get many files of program
 - you need to combine(link) all of them into a single program
- Library
 - programs prepared by other people for your convenience

Execution & Debugging

- after compile, you get a file containing machine code that can be executed on a computer
 - >>a.out
- run time errors are easy to correct
 - divide by zero, segmentation fault, ...
- logical errors are from your mind!!

- # for preprocessor
- indicates where to look for printf() function
- .h file is a header file

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

- entry point
- called on program start
- only one main() in any program

```
int main(void)
```

```
{
```

```
    printf("Hello, world!\n");
```

```
    return 0;
```

```
}
```

- belongs to stdio.h
- "Hello...." is a parameter to printf()