C Programming
Course Basics

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- TA
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**Lectures**
- 1~2 hours lectures at 400212
- 2~3 hours lab at 400202
Course Materials

• Textbook

• 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
• You need a language to tell computers to do what you want
  – Korean, English, ... natural languages are used by human
    Find the 100\textsuperscript{th} 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

\[
\text{TotalScore} = \text{MidScore} + \text{FinalScore};
\]

```
MOV AX, MIDSCORE
MOV CX, FINALSCORE
ADD AX CX
MOV TOTALSCORE, AX
```
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!!
#include <stdio.h>

int main(void)
{
    printf("Hello, world!\n");
    return 0;
}

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

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

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