Computer Programming I

This is an introductory course to computer programming for engineers. Knowledge of C programming is commonly accepted as of primary importance for an engineer. This knowledge can easily be translated to any other programming language.

Practical Exercise

Course Syllabus

Week	Lecture	Laboratory	Notes
Week 01	• Introduction to EEC120 Computer Programming I • Introduction to Computer Systems 1. Hardware (CPU, input, output) 2. Software (Kernel, OS, userspace) 3. Numbers & Logic • Introduction to Computer Programming 1. Algorithms: instruction sequencing 2. Flow-charts: visual representation 3. Interpreters ⇒ scripts 4. Compiler and Linkers ⇒ binary executables	• Tools (compiler/IDE) Installation/Setup	• **[VIDEO GUIDE]**???

Week	Lecture	Laboratory	Notes
Week 02	• Introduction to C language 1. Basic code structure (syntax) 2. Function and code-block 3. Simple text display • Creating first executable binary 1. Syntax (language) and semantic (decision logic) errors 2. Simple debugging	• Explore building binary from c source code • Explore creating text decorations using symbols	• **[VIDEO GUIDE]**???
Week 03	• C Variables (data storage) 1. data types and sizes • C Operators 1. arithmetic and logic 2. boolean vs bitwise • Data processing 1. equations and tasks 2. (optional) math.h library functions	• Understanding storage types and practical use • Exploring code that does equations/calculations	**Assignment 1 Queue**
Week 04	• Flow control: Branches (selection) 1. `if-else` structure 2. `switch-case` structure 3. (otional) the `?:` combo	• Understanding decision making process in code • Exploring code that control program flow	
Week 05	• Flow control: Loops (repetition) 1. `for` structure 2. `while` structure 3. `do-while` structure	• Understanding iterative flow in code • Exploring code that repeats itself	**Assignment 1 Due (5%)**

Week	Lecture	Laboratory	Notes
Week 06	• C (Data) Array 1. storage in groups 2. accessing array items (content)	• Understanding array as group-storage • Exploring code that process on arrays (read/write)	**Lab Assessment 1 (10%)**
Week 07	• C String 1. array of chars (null terminated) 2. (optional) string.h library functions	• Understanding string as char array • Exploring code that process on strings (read/write)	**Mid-term Examination (20%)**
Week 08	• C Pointers 1. indirect data access (data that holds address to other data) 2. array name as address 3. pointers in loops 4. pointer arithmetic	• Understanding pointers as method for indirect access • Exploring code that deals with (or use) pointers	**Assignment 2 Queue**
Week 09	• C Functions 1. function return value 2. function parameters 3. (extra) data/variable scope and lifetime	• Understanding functions as building block for modular programming • Exploring code that has multiple functions	
Week 10	• File access (permanent storage) 1. accessing file on secondary memory (i.e. disks) 2. text vs binary file	• Understanding pros/cons of secondary storage • Exploring code that read/write from/to files	**Assignment 2 Due (5%)**

Week	Lecture	Laboratory	Notes

Week 11	• Practical Applications
	  ◦ requirements and considerations
	• C struct
	  1. data group
	  2. accessing data in struct
		• Lab Project
		• (extra) use struct to create abstract data type
		• (extra) creating functions to process struct (towards oop?)
			Lab Assessment 2 (10%)

Week 12	• Practical Applications (cont.) ◦ requirements and considerations	• Lab Project (cont.)	
Week 13	• Practical Applications (cont.) ◦ requirements and considerations	• Lab Project (cont.)	
Week 14	• Practical Applications (cont.) ◦ requirements and considerations	• Lab Project (cont.)	**Lab Project Due (10%)**

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Introduction to C Programming

Variable and Operators

intsize.c

```
#include<stdio.h>
int main(void)
{
    printf("Size of unsigned int: %d\n",sizeof(unsigned int));
    printf("Size of unsigned long long: %d\n",sizeof(unsigned long
long));
    printf("Size of unsigned long: %d\n",sizeof(unsigned long));
    printf("Size of unsigned short: %d\n",sizeof(unsigned short));
    printf("Size of unsigned char: %d\n",sizeof(unsigned char));
    return 0;
}
```

varsize.c

```c
#include<stdio.h>
int main(void)
{
    printf("Size of int: %d\n",sizeof(int));
    printf("Size of float: %d\n",sizeof(float));
    printf("Size of double: %d\n",sizeof(double));
    printf("Size of long double: %d\n",sizeof(long double));
    printf("Size of char: %d\n",sizeof(char));
    return 0;
}
```

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