

Advanced Programming

Introduction

Course Information

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Course Information

- Review of C Programming Language
 - Variables
 - Statements
 - Control structures
 - Loops
 - Arrays and Strings
 - Structs
 - Pointers
 - Functions

Course Information

- Encapsulation and Abstract Data Type
- Classes and Objects
- Overloading Operators
- Overloading Functions
- Virtual functions
- Inheritance
- Virtual Base Classes
- Streams and Input/Output
- Templates, Standard Template Library (STL)

Course Information

- Text Book: C++ Programming: From Problem Analysis to Program Design, 4th Edition
By: *D.S. Malik*
- *Course Webpage: ceng241.cankaya.edu.tr
(Use summer 2015 tab only)*
- Evaluation
 - Five pop quizzes (10 % each)
 - One Final exam (30 %)
 - Lab exam (15 %)
 - Lab attendance (5 %)

The Structure of A C Program

- A C program starts with a set of header file definitions, followed by the main function.

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

```
void main()
```

```
{
```

```
    // instructions
```

```
}
```

Variables

- Variables are used to store values in temporary locations
- Basic variable types are:
int, float, char

Standard Input/Output

- scanf and printf are standard input and output functions
- To use these functions we have to include `stdio.h`
- The functions take a format string and the names of variables as arguments

Statements

- A statement in C can be either a mathematical or a logical expression
- Assignment is used to store the result of evaluation

Mathematical Expressions

- An expression is evaluated according to the precedence of its operators
- Operators:
 - + , - , * , / , %
 - ++ , --

Logical Expressions

- Logical expressions are evaluated to true or false
- Operators:
 - >, <, >=, <=, ==
 - !, &&, ||

Control Statements

- Control statements are used for decision making
- Control statements in C are:
 - If-else
 - Switch-case
 - ?

Example

- Write a program to check if all 5 digits of an integer number are odd
- Write a program to decide to choose the second largest number in a group of 4 integers

Loops

- Loops are used for repeating instructions (possibly with different data)
- Loops in C:
 - While
 - Do-while
 - For

Example

- Write a program to find out if an integer is prime
- Write a program to read an integer and write it as the product of its prime factors
- Write a program to read an integer as a sequence of characters and convert it into its equivalent number. The number may include a sign character