

## CSC 2430 Midterm Exam Study Guide

### Exam Overview

- The test will be in-class (timed 80 minutes), written, and closed-book.
- The primary focus will be on
  - built-in data types, particularly integer-based binary, hex and octal representations and conversions
  - arrays, particularly usage and manipulation of ASCIIZ c-string arrays
  - functions, prototypes, parameter passing, default arguments, overloading
- Questions will be combination of short-answer fill-in and programming exercises, e.g.,
  - definition or description of C++ language features
  - data value representations and conversions
  - implementing small functions, such as those in stringPkg.h

The test will primarily cover the following material from the textbook and class notes:

**Texts:** Malik, C++ Programming, Program Design Including Data Structures, 7<sup>th</sup> Edition

**Chapters 1-8:** covered in CSC 1230, carefully reviewed in CSC 2430.

### Chapter 8

**Arrays and Strings** (slight coverage CSC 1230, heavy coverage in CSC 2430 including c-strings)

Arrays. Homogeneous aggregates.

C-Strings; the C-standard <cstring> library functions (e.g., strcpy, strcpy\_s, strcat\_s, strlen, etc.)

Complete coverage of material in class notes handouts:

- Life Cycle of Software (light coverage)
- Cpp Review
  - Integer representations. Decimal / Binary / Hex bases and data conversions.
  - iostream I/O
  - Function Prototypes
  - Function default parameter / arguments
  - Function overloading
  - Function – parameters by Value, by Reference.
- Array lab assignments, e.g., array value statistics, array value computations.
- C-Strings – Secure
  - ASCIIZ C-String array representations
  - Use and implementation of standardized c-string functions, e.g., strlen, strcpy\_s, strncpy\_s, strcat\_s, strncat\_s, strcmp, strcmp, strncmp, strncmp
- Functions with array parameters
- stringPkg lab assignments

Here are a few (briefly stated) examples of questions from prior midterm exams:

- Convert  $182_{10}$  into binary (or into hex).  
Convert  $32768_{10}$  into binary (or into hex).  
Convert  $E7A2_{16}$  into binary or decimal.  
Convert  $1110010110_2$  into decimal (or into hex).
- Understand or code a function that uses default parameters.
- Describe or use a group of overloaded functions.
- Write a function to find the average of a 1-dim array of floats.
- Write a function to multiply two 1-dim arrays together to produce a third array (dot product) (e.g.,  $a[5] = \{ 10, 20, 30, 40, 50 \}$ ;  $b[5] = \{ 3, 5, 0, 2, 4 \}$ ;  $\rightarrow$  compute  $c[5] = \{ 30, 100, 0, 80, 200 \}$  ).
- Write a function to convert a cstring array to all lowercase or all uppercase letters (e.g. for example, "CSC 2430 Data Structures" is converted to "csc 2430 data structures").
- Write a function to remove all blank characters from a cstring array (e.g., " Here is my String "  $\rightarrow$  "HereismyString" )
- Write a function to copy one cstring array to another cstring array.
- Write a function to convert a cstring array that contains a string of digit characters into the corresponding integer value (e.g., "1234" gets converted to the int value 1234).  
- Remember, the character digit '5' can be converted to numeric value ('5' - '0'),  
and "1234" means  
$$(( (1) * 10 + 2) * 10 + 3) * 10 + 4$$
  
which can be computed in a loop.
- Write a function to count the number of "words" in a cstring (where words are separated by blanks) (e.g., "I am Mike, you're one of my friends." has 8 words).
- Write a function to determine the location of a particular substring value within a larger string (e.g., where is the substring "The" located in the cstring "Hi There" ?  $\rightarrow$  answer: position 3).
- Write a function to compare two cstring values to determine which one has the larger alphabetic value (e.g., "a" vs "abc", or "abc" vs "ABC", or "Hi There" vs "Hello", or "A1" vs "A23", etc).