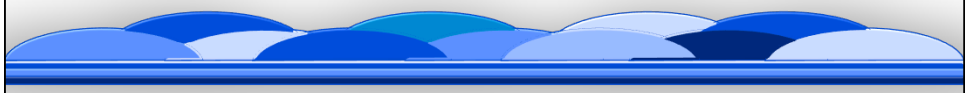
EXAM 1 - Overview



FORMAT

- Bring a scantron
- Some T/F
- Some Mult Choice
- Some Problem Solving
- NOT open notes/book

Topics Covered

1. Basic Input/Output
2. Arithmetic in C++
3. Selection
4. Repetition
5. Functions
6. Arrays
7. Searching & Sorting
8. Structs

- and some other smaller topics like files

Some tips – avoiding test anxiety

- Get a good nights rest
  - I know this is tough, but you don't think as well without sleep
- Don't skip a meal before an exam
  - Your brain needs protein → try not to eat a high carb meal
- Don't Cram! Pace your studying
  - Try not to put it off until the last minute
  - If you pace yourself → you will be prepared
- Study with classmates so you can compare notes
  - don't discuss the exam just before coming in
  - their anxiety may impact you
- Take deep breaths → relax yourself
  - Thing positive thoughts → remind yourself that you are prepared
- Don't get bogged down on a question
  - answer the questions you know quickly → go back to the others
- Ask Questions
  - Calm yourself before you come in…
- Avoid being late

Basics

- T/F A C++ identifier may not begin with a digit or an underscore.
- What is a literal constant?
- What type of loop should be used for a program segment that should sum a list of positive integers (it is unknown how many inputs the user will provide_?
- What should the LCV be?
- What should the sentinel value be?
- When should you initialize the LCV, for each loop?
- When should you update the LCV, for each loop?

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Output

- What is this symbol <<?
- What can be on the left side of the insertion operator?
- What can be on the right side of the insertion operator?
- Which manipulator(s) would you use output in columns ?
- What are the escape sequences?
- Which output manipulators would you use to format floating point numbers?
- Know how they work together

Input

- What is this symbol >>?
- What can appear on the left side of the extraction operator?
- What can appear on the right side of the extraction operator?
- When do you have to use .ignore() when reading in c-strings or strings?
- What function do you use to get a line of characters and place it in a string
- T/F cin always reads directly in from the keyboard

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Arithmetic

- What is the difference between type coercion and type casting?
- How would the following statement be evaluated?
  in1 = (fn3 = (in2 = 5) * (4 / 8.0)) * 2;
- Rewrite the following using combined operators:
  The remainder of n1 divided by (n2 * 12) with the value stored in n1
- Also understand Boolean expressions and the conditional operator.

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Arithmetic

- What is the order of precedence?

Order of Precedence
()
++, --
! (unary)
* / %
+ -
< <= > >=
== !=
&&
||
= += -= *= /= %=

- How would the following statement s be evaluated?

```
a = 4;
b = 3;
c = --a + 10 * b++;
```

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Functions

- T/F If a function contains a statement that changes a value parameter, only the copy of the argument is changed, not the original.
- How do you declare a function?
- Where does the prototype go?
- What is the scope of a local identifier?
- T/F The scope of a value parameter is identical to the scope of a local variable declared in the outermost block of the function body.
- T/F In C++, corresponding arguments from a calling function and parameters from a called function must have the same name.
- When would you use a void function?

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Functions

- How do you return multiple values from a function?
- What is a side effect?
- How can we avoid side effects?

  Parameter passage by reference is used if a parameter's data flow is
  a) one-way, into the function
  b) one-way, out of the function
  c) two-way, into and out of the function
- T/F When passing by value data flow is one-way – into the function
- What type of arguments can be sent from the calling function when passing by reference?

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Functions

- What type of arguments can be sent from the calling function when passing by value?
- T/F All functions should have a return statement.
- If a module is supposed to compute and return the average of five numbers, which is more appropriate a value returning function or a void function?
- T/F Functions must have a return data type
- What should the return data type for main be?
- What is the advantage of using functions?

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Functions

- What are the three steps in the function process
- Where do each of the steps above occur
- Declare a function that is passed two integers representing a sum and a count and returns an average.
- Declare a function that returns the sum & avg of an integer array.
- T/F You can only have 1 return statement in a function
- What is an advantage of passing by value?

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Functions

- What is a disadvantage of passing by value?
- When we pass by reference what is passed to the calling function.
- What is a disadvantage of passing my reference?
- How do you pass by reference?

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Header Files

- T/F You can put executable code in a header file.
- T/F It doesn't matter what order the directives and declarations appear in a header file.
- What order should the directives appear and why?
- What are these lines in a header file for?

```
#ifndef MYHEADER_H_
#define MYHEADER_H_
 #endif
```

- Does the extension for your header file matter?
- How do you include a user-defined header file?

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ARRAYS

- What is an array?
- Is this a valid statement: firstArray = secondArray;
- Is this a valid statement: if(firstArray == secondArray)
- T/F an array is a composite data type.
- Why should we use constants for array size?
- How do we initialize an array?

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ARRAYS

- T/F An individual component of an array cannot be passed as an argument to a function. The entire array must be sent.
- How many different data types can you have in one array?
- T/F Given the declaration
  int someAr[20];
  int someAr2[20];
  cout << someAr[3]; outputs the 3rd element in the array.

  cin >> someAr[20]; will produce a compiler error

  someAr = someAr2; will transfer all values from someAr2 to someAr

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ARRAYS

- What is the advantage of passing by reference?
- Which of the following is true about an array?
  a) Arrays are always passed by reference.
  b) The name of an array is the address in memory of the first element.
  c) Array subscripts always begin at 0.
- How would you declare an array of 20 c-strings that can hold up to 11 characters?
- How would you compare an array of int.

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ARRAYS

- What will this statement do: int item[5]={2,12,1};
- What will this statement do: int item[5]={0};
- What will this statement do: int item[5]={2,12,1,2,9,5};
- T/F The compiler will give you an out of bounds error when using arrays if your index is too big or too small.
- What is stored in the array variable? (e.g. myArray)
- What is the base address?

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ARRAYS

```
float gpa[5];  // an array holding 5 grade point averages - INP.& OUT.
// search an array
index = 0;
while(index  <  MAX_ITEMS  &&  !found)
    {
          if (item[index] == searchItem)
          {
              found=true;
          }
          else
          {
               index++;
          }
    }
// output the contents of the array
     cout << "\n\nStudent Grade Point Averages\n
     for(int j = 0; j < 5; j++)
     {
        cout << "\nGPA for student " << j+1 <<": " << gpa[j];
     }
```

Know how to u
loops with arra

When do you use a for loop →

When do you use a while loop?

Know how to use a loop to initialize an array too!

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ARRAYS

- T/F Arrays can be returned as a return value in a function.
- T/F Arrays must be passed by reference using the &.
- T/F When you pass an array you don't have to include the size in the parameter list for the first dimension.
- How should you pass an array when you don't intend to modify it in the function being called.
- T/F C-Strings are special arrays.
- T/F char name[16]= "Pete"; ⇔ char name[]= "Pete";
- Make sure you understand parallel arrays!

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ARRAYS

- How would you declare parallel arrays that could contain a movie title, genre, and running time (in minutes)? Assume a const AR_SIZE
- How would your read these values in from a file (assume a list with \n after each entry) – use the fstream variable inFile?

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ARRAYS

- How would you declare a multi-dimensional array that would hold 10 scores for 5 people?
- How would you read these values into the array from a file (assume the inFile variable is already assigned – assume 10 scores per row)?
- how to output multi-dimensional arrays and how to initialize them.

Strings

- How would you compare C-Strings.
- T/F Strings have null terminators.
- T/F String size is dynamically allocated.
- T/F You can't use getline with a string only with C-strings.
- If we declare 3 strings. This is valid str3 = str1+str2.
- What will it do?

FILES

- What is the 5-step process for using an I/O file?
- Which loop structure is best for reading in input from a file?
- When reading in from a file into an array what are the two conditions that should be checked?

Enums/typedefs

- What are the 3 basic categories of datatypes?
- What are the 3 basic simple datatypes
- What category do arrays fall under?
- How would you define an enumerated type to represent the seasons?
- Why would you use enumerated types?

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Enums/typedefs

- Since enums are essentially evaluated into integers, can you perform arithmetic on them?
- How would your output an enum?
- What does a typedef do?
- Can you do this?
  typedef float FloatArrayType[100];
- How would you use it?

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Searches&Sorts

- What are the advantages of a sequential search?
- What is the disadvantage of a sequential search?
- What is the advantage of a binary search?
- When would you use a sequential search over a binary search?
- Know how to identify the searching and sorting algorithms.
- Know how to implement them

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Searches & Sorts

- Which search is this?

```
int intAr[AR_SIZE] = { 5, 12, 6, 4, 2};
index=0;
found = false;
ikey = 6;

while (!found  && index < AR_SIZE)
{
      if (intAr[index] == ikey)
      {
        found = true;
      }
      else
      {
        index ++;
      }
}
```

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Searches & Sorts

- Order the sorts discussed in class in order of efficiency
- Why is the most efficient sort more efficient?
- Know how to write these sorts and how to identify them

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Searches & Sorts

- Which sort is this?

```
const int AR_SIZE = 5;
int intAr[AR_SIZE] = { 7, 12, 6,14, 22};

for (int i = 1; i <AR_SIZE; ++i)
{
      temp = intAr[i];
      j = i - 1;
      while ( j >= 0 && intAr[j] > temp)
      {
           intAr[ j + 1 ] = intAr[j];
           j = j - 1;
      }
      intAr[ j + 1 ] = temp;
 }
```

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Structs

- What is the advantage of using structs?
- What is a member?
- Are aggregate operations allowed on structs?
- Can you pass structs by value or reference?
- Can structs be a return type?

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Structs

- Define a struct called DvdRec, that contains the title, genre, and running time.
- Declare an array 100 elements of that struct called movies.
- How would you output the title of the 10th element in your array?
- Be able to write a function that can read into an array of structs or output an array of structs.

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