

CMSC 212 Midterm #1 (Fall 2005)

Name _____

Signature _____

Discussion Section Time (circle one):

12:00 1:00 2:00 3:00 4:00 5:00
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- (1) This exam is closed book, closed notes, and closed neighbor. No calculators are permitted. Violation of any of these rules will be considered academic dishonesty.
- (2) You have 70 minutes to complete this exam. If you finish early, you may turn in your exam at the front of the room and leave. However if you finish during the last ten minutes of the exam please remain seated until the end of the exam so you don't disturb others. Failure to follow this direction will result in points being deducted from your exam.
- (3) Write all answers on the exam. If you need additional paper, we will provide it. Make sure your name is on any additional sheets.
- (4) Partial credit will be given for most questions assuming we can figure out what you were doing.
- (5) Please write neatly. Print your answers, if that will make your handwriting easier to read. If you write something, and wish to cross it out, simply put an X through it. Please clearly indicate if your answer continues onto another page.
- (6) If you need additional paper, raise your hand and we will bring it to you. Any additional paper you receive must be submitted with your exam paper. You must clearly mark what question is on that page both on the extra paper and on this exam sheet.

Page	Possible	Score
2	16	
3	15	
4	15	
5	18	
6	14	
7	7	
8	7	
9	8	
Total	100	

1.) [16 points] Define and explain the following terms (compare and contrast means give at least one similarity and one difference):

a) Compare and contrast the way space is allocated through the use of the stack and the use of the heap.

b) List two things that *should* be in header files, and two things that *shouldn't*.

1. Two things that SHOULD be in a header file:

2. Two things that SHOULD NOT be in a header file:

c) Compare and contrast **stderr** and **stdout**.

d) Functions may be defined with array dimensions omitted for example:

```
int func1(int arr[][5]); or int func2(int arr[]);
```

Explain why some of the dimensions (the 5 in this example) need to be specified and why others don't.

4.) [18 points] Use the structure on the final page for the definitions of the types used here - that page can be torn off, but make sure you write your name on it and submit it with your exam paper. For each of the following questions, the first line gives the declaration of a variable, and the second is an expression using that variable.

i) You may assume any space that would have had to be dynamically allocated has been.

ii) You may also assume that if it is a pointer it is indeed pointing to valid space.

iii) You need to fill in the first blank to say if that expression would be valid or invalid

iv) If you put valid in the first column for a given item, in the second column you must then tell the type the expressions refers to. You can think of this in terms of how you would print the item – if it is something you would print using a %s, then say string, if it is something you would print using a %c then say character, etc.

	VALID/INVALID	TYPE (if valid)
a) <code>PersonTy p;</code> <code>p.list->color[1]</code>	_____	_____
b) <code>PersonTy *m;</code> <code>m->name</code>	_____	_____
c) <code>InventoryTy j;</code> <code>j.invlst->peryard</code>	_____	_____
d) <code>FabricTy f;</code> <code>*(f.color)</code>	_____	_____
e) <code>InventoryTy *x;</code> <code>&(x.storename[0])</code>	_____	_____
f) <code>PersonTy *p;</code> <code>p->list->color</code>	_____	_____

5.) [21 points] Use the types defined on the last page of this exam to write each of the following functions. The last page of the exam can be torn off the exam, but make sure you put your name on that paper and submit it with your exam when you are finished. You must assume the prototype given is already present (in the .h file), and you must give the complete implementation that would appear in the corresponding .c file (including the function header). For any functions that require data to be already filled in, you may assume the space has been allocated correctly and valid information has already been filled in.

- a) A function that calculates the cost for this customer needs to return the amount of money the customer order will be based on their list of purchased fabrics. If it can't be calculated, return -1.

```
float OrderCost(PersonTy);
```

- b) A function that copies an individual FabricTy object. Make sure the original is not harmed during the copy process, and make sure the newly created one is passed back through the return value of the function. Also, if the color of the original is "red" change it to "scarlet" in the copy. If unsuccessful, return NULL.

```
FabricTy *copyFabric(FabricTy);
```

- c) Read from the input stream named to fill the FabricTy name and color. The number of yards and cost should be set to 0. The name can be multiple words such as “synthetic alpaca wool” but the color will be one and exactly one word (as separated by spaces). There will be at least two words separated by a space on the input line. The whole input line will not be more than 80 characters. You may assume the file passed is already open for reading and is not at the end of file.

```
FabricTy *fillFabric(FILE *);
```


b) Briefly describe the purpose of each of the following UNIX commands

1. **ls** _____

2. **cp** _____

3. **ln** _____

4. **cd** _____

c) What is the difference between <x> and the "x" when used on a #include line?

d) What is the purpose of the -o option on the cc compiler?

This page intentionally blank - You may use it for scratch or to continue an answer. If it is used to continue an answer, make sure you clearly mark it both here and where that question appears in the exam.

Name: _____

The types defined on this page will be used for two of the questions on this exam. This page can be torn off the exam paper to make it easier for you to see the definitions while you answer the questions. Make sure you write your name on this paper, put it inside your exam, and submit it with your exam paper when you are finished.

```
#define ARRSIZE 20

typedef char *StrTy;
    /*string dynamically allocated to the space needed at the time*/

typedef struct{
    StrTy fabricname;    /*type of fabric, i.e. wool, silk, etc. */
    StrTy color;        /* color of the fabric, i.e. red, blue, etc. */
    int numberofyards; /* the number of yards purchased or on the bolt */
    float peryard;     /* how much this fabric costs per yard */
} FabricTy;

typedef struct {
    int size;          /* number of different kinds of fabric in inventory */
    FabricTy invlist[ARRSIZE]; /*array of fabric types */
    StrTy storename;  /* name of this store */
}InventoryTy;

typedef struct{
    StrTy name;        /* the name of the customer */
    int numofitems;   /* the number of items this person is purchasing */
    FabricTy *list;   /* the list of items this person is purchasing */
} PersonTy;
```