

# Final - Rules

- Closed Book
- closed Notes
- 1 hr 50 min
- Picture ID

## CS 161: Introduction to Computer Science 1

Name: \_\_\_\_\_;



CH


1. (25 points) Write one or two lines of code to answer each of the following questions. -- Do not write complete programs --

a) create an array that is large enough to hold your first name and another to hold your last name

```
char first [6];  
char last [25];
```

b) Now, read in just your first name into this array; show the input operation:

```
cin.get(first, 6);
```



c) What if your last name was Van Norman what would the input operation look like:

```
cin.get(last, 25, '\n');
```

d) Now, write the code to show how you can get rid of all characters from the input buffer, until a ~~carriage return~~ is encountered:

enter  
newline

```
cin.ignore(100, '\n');
```

## 2. (25 points) Short Answer questions on Functions

a) Write a function prototype that takes in 2 integer arguments (by value) and returns an integer:

```
int sum ( int a , int b );
```

b) Now change the function prototype so that the function can use the first argument to supply the calling routine with the answer (instead of “returning” an integer):

```
void sum ( int &a , int b );
```

c) Why is it better to use call by reference than it is to use call by value?

d) Write a function prototype that takes in a float as an argument (by reference) and returns a single character

char calculate (float &);

e) When working with an array of characters, how do you know when you have reached the end of the character array?

'\0'



#### 4) (25 points) Arrays of characters

a) How can you decide if a word, stored in an array of character is capitalized (Is the first character upper case?)?

Find out if the word is capitalized:

```
if (word[0] >= 'A' && word[0] <= 'Z')
```


```
for: if (word[0] == topper(word[0]))
```

b) For this same array, how can you compare this array to see if it is the phrase "hello there"

```
if (isupper(word[0]))
```

```
if (strcmp(word, "hello there") == 0) // match
```

C) How could you count the number of times the complete word "hi" can be found in an array of characters.



**CS161 Final Exam**  
**Introduction to Computer Science 1**

**Name:** \_\_\_\_\_

**1. Algorithms, Style, Ethics**

**a. Briefly explain why it is important to write an algorithm before you create your program**

**b. Give an example of a situation that would benefit from an algorithm**



**c. Show an example of some C++ code that exhibits good style –**

*Put your code here:*

*Focus on the areas of*

*emphasis*

*good style*

```
#include <iostream>  
using namespace std;
```

```
int main()
```

```
{
```

```
}
```

d. I sent an email the other day to a Professor. I thought it was confidential. They forwarded it on to the entire faculty. “They e-mailed me a copy, so I can post it.” Is this ethical? Briefly discuss.

## 2. C++ Programming – Fundamentals

a. Show two **VALID** variable names

---

b. Show two **INVALID** variable names

\$hi

---

c. Create a variable to hold a user's response of Y or N

---

d. Prompt the user to enter in a response of Y or N:

---

e. Show how to read the response in from the user:

---

f. Check to see if the response is either a Y or an N

---

g. Check to see if the response is either a Y or an N or a lower case y or n

---

h. What kind of variable would we need if the user was allowed to enter YES or NO:

---

i. Show how to read the response of YES or NO in from the user:

---

j. Show how to find out if the user enter in YES or NO (all caps)... or something else incorrectly:

strcmp

### **3. C++ Programming – Comprehensive**

**a. What type of loop would you use if you wanted to capitalize every character in an array. Explain why you selected this loop**

---

**b. What type of loop would you use to play a game until the user either wins or wants to be done. Explain why you selected this loop.**

---

c. What type of loop would you use to play a game until the user either wins or wants to be done. Explain why you selected this loop.

for  
d. Write prototype statements a function that returns nothing and takes a single character (by value) and a floating point value (by reference) as arguments:

void some\_function (char a, float & b);

e. Assume you have an array of characters and assume that it has some valid information in it (maybe a sentence) followed by a '\0'. Your job is to count the number of lower case 'a' characters in the array:

f. What if I wanted to copy the word "holiday" into an array of characters, how large should I make the array?

g. Why would I want to use the 3 argument version of cin.get?

```
cin.get(paraq, 501, '@');
```

cin >>

One word

- cctype
  - o toupper tolower
- cstring
  - o strcmp strcpy strlen
- iostream
  - o cin.get (3 argument)
  - o cin.ignore (2 argument)

To upper & to lower

① Pass by VALUE functions

```
char toupper(char);
```

Return the upper case character

original

```
char ch = 'a';  
ch = toupper(ch)
```

② "clear" an array

```
char word[11];  
word[0] = '\0';
```



1) int strlen(char []);

```
int len;  
char word[11];  
cin >> word;
```

```
{  
  len = strlen(word);  
}
```

2)

strcpy ( arrays of char, array of char )

↑ destination      ↑ source



```
char copy[11];  
strcpy(copy, word);
```

3) int strcmp(char [], char []);

if (strcmp(word, copy) == 0) //same

if ( " " " " ) < 0  
1st word less and

if ( " " " " ) > 0  
1st word greater and

3. (25 Points) Write C++ Code

0	1	2	3	4
hello\0				

Assume you have an array of characters and assume that it has some valid information in it (maybe a sentence) followed by a '\0'. Your job is to count the number of uppercase alphabetic characters in the array.

- Use For Loop -

- a) If this was written as a function... what do you think the function prototype would look like?

```
int count_upper(char array[]);
```

- b) Ok...now write the code (no, it doesn't need to be in a function!)

```
int count_upper(char array[])  
{  
    int count = 0;  
    int len = strlen(array);  
    for (int i = 0; i < len; ++i)  
        if (array[i] == toupper(array[i]))  
            ++count;  
    return count;  
}
```