



CS 272 Exam 2 version B

O O Programming (New Mexico State University)

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2017-03-16CS 271 - Exam 2
Version BC Language

The language used in this part of the exam is C. You will receive 0 points for any question where you use Java, C++, or other programming language syntax.

1. (15 points) A programming project includes files counts.h, counts.c, primes.c, and primeTest.c. The file primeTest.c contains the main function. Write a makefile that will compile and link these components, and create an executable called **primeTest**. The first target should be named "all". Do not write a "clean" target.

all: primeTest

primeTest: primeTest.o primes.o counts.o

gcc -o primeTest primeTest.o primes.o counts.o

primeTest.o: ~~primes.c~~ primeTest.cgcc -c ~~primes.c~~ primeTest.cprimes.o: primes.c ~~counts.c~~gcc -c primes.c ~~counts.c~~

counts.o: counts.c counts.h

gcc -c counts.c ~~counts.h~~

2. (10 points) Given the following C program and the input given below, show output that will be printed by the program.

Input file contains

butter
garlic bread
12 tomatoes
\$ 16.00

Output

a letter
a letter
other
a digit

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

int main (void) {

    char line[80];
    int count = 0;

    FILE *cfPtr;

    if ( (cfPtr = fopen( "lines.dat", "r" )) == NULL) {
        puts( "File could not be opened\n");
    }
    else {

        fgets( line, 80, cfPtr );

        while ( !feof( cfPtr ) ) {

            if (isalpha(line[count]) printf("a letter\n");
            else if (isdigit(line[count]) printf("a digit\n");
            else if (ispunct(line[count]) printf("punctuation\n");
            else printf("other\n");
            count++;

            fgets( line, 80, cfPtr );

        } // end while

        fclose ( cfPtr );
    } // end else
} // end main
```

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3. (2 points) All parameter passing in C is pass-by- Value

4. (3 points) Explain what the purpose of const is in the following function header.

void aFunction (const int * cPtr)

It makes the integer-type pointer cPtr read only/constant within the function and does not allow it to be changed from the original value.

5. (20 points) Complete the following function so that it will accept a pointer to the first character in a null-terminated character string. The function should determine the length of the longest word in the string. Words are separated by one space. You may assume that there are no characters in the string except letters and the space character and there are no extra spaces at the beginning or the end of the string. You may assume that the libraries you need have already been included.

Example: longestWord("This is a difficult question") should return 9.

int longestWord (char *cPtr) {

int index = 0;

int longest1 = 0;

int longest2 = 0;

int length = strlen(cPtr);

while (index < length) {

if (index == 0) {

while (cPtr[index] != ' ' || cPtr[index] != '\0') {

longest1++;

index++;

} // end while for 1st word

} // end if (index == 0)

while (cPtr[index] != ' ' || cPtr[index] != '\0') {

longest2++;

index++;

} // end regular while

if (longest2 > longest1) {

longest1 = longest2;

longest2 = 0; // reset longest2

} // end while (index < length)

return longest1;

} // end function longestWord

✓ This part would be true until the end of the string.

anything or true = true
true or anything = true
so this is an infinite loop.

Only checking lengths of 2 words?

-10
If the code reached this point, index is not set back to 0. This while loop would have the same problem.

C++ Language

The language used in this part of the exam is C++. You will receive 0 points for any question where you use Java, C (specifically printf or scanf), or other programming language syntax.

6. (25 points) Given the UML diagram below, write the header file with the C++ class definition.

Place a preprocessor wrapper with constant EVENT_H in your header file.

Event
- day : int - month : int - year : int - hour : int - minute : int - ampm : string
«constructor» Event() + getDay() : int + getMonth() : int + getYear() : int + getHour() : int + getMinute() : int + getAmpm() : string + setDay(d : int) + setMonth(m : int) + setYear(y : int) + setHour(h : int) + setMinute(m : int) + setAmpm(s : string)

** use the next page to write your answer **

```
#ifndef EVENT_H
#define EVENT_H

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

```
class Event {
private:
    int day;
    int month;
    int year;
    int hour;
    int minute;
    string ampm;
```

```
public:
```

```
    Event();
    int Event::getDay();
    int Event::getMonth();
    int Event::getYear();
    int Event::getHour();
    int Event::getMinute();
    string Event::getAmpm();
    void Event::setDay(int d);
    void Event::setMonth(int m);
    void Event::setYear(int y);
    void Event::setHour(int h);
    void Event::setMinute(int m);
    void Event::setAmpm(string s);
```

```
};
```

```
#endif EVENT_H
```

Don't use the scope resolution when you are in the class definition.

7. (25 points)

a. Using the word "get" to start the name of an accessor is called a programming convention.

b. What is the primary task performed by a constructor?

Initialize the private data members of the object.

c. Write the C++ statement to input a value from the standard input stream and store it in a double variable named **frequency**.

cin >> frequency;

d. What does UML stand for?

Unified Modeling Language

e. Which functions can access private data members?

Only functions within a class can access private data members.

f. Write the Linux command to compile a C++ program named **boat.cpp** and produce an executable called **runboat**.

g++ -o runboat boat.cpp

g. Write the C++ statement to print an integer variable named **maxSize** followed by a newline.

cout << maxSize << endl;

3.5714
25.000
05.0
10
30
20