

SI204, Practice 12-Week Exam, Noveber 2002

1. In answering the following questions, if function definitions are not explicitly given, assume that correct definitions for the given prototypes do appear somewhere later in the code.

<pre>void printmin(int a, int b); int main() { int x, y; cin >> x >> y; cout << printmin(x,y) << endl; return 0; }</pre>	Why do I get a compiler error at the "cout" line?
<pre>double square(double W); int main() { string A = "3.11"; cout << square(A) << endl; return 0; }</pre>	Why do I get a compiler error at the "cout" line?
<pre>double square(int W); int main() { cout << square(0.25) << endl; return 0; } double square(int W) { return W*W; }</pre>	Why does this print out zero?

<pre> void readpos(int N); int main() { int k = 0; readpos(k); cout << k << endl; return 0; } void readpos(int N) { do { cout << "Enter a positive number: "; cin >> N; while (N <= 0); } </pre>	<p>Why does this print out zero no matter what the user enters?</p>
<pre> int max(int a, int b); double max(double a, double b); int main() { int k; double x; cin >> k >> x; cout << max(k,x) << endl; return 0; } </pre>	<p>Why does the compiler complain about the "cout" line?</p>
<pre> int mystery(int,int); int mystery(int,char); char mystery(char,char); bool mystery(int,char); double mystery(int,double); </pre>	<p>What is it about these function prototypes that causes the compiler to issue an error message?</p>

2. The `ifstream` object `IN` is attached to the file `input.txt`, whose contents are displayed below. The given code fragment is intended to print the sum all of the `ints` appearing in the file, which in this case ought to be 20. Instead, however, it prints 28. Explain what is happening and why!

```
int total = 0, k;  
while(!IN.eof())  
{  
    IN >> k;  
    total = total + k;  
}  
cout << total << endl;
```

12
13
-13
8

input.txt

3. Write the body of a function named `firstlast` that takes an array `A` of `ints` and an `int N`, the number of elements in `A`, and prints out the first and last negative numbers in the array. For example, if `A` is

0	3	-3	-4	2	5	-1	4	4	2
---	---	----	----	---	---	----	---	---	---

the function should print out -3 and -1. You may assume there will always be at least one negative number in `A`.

4. The code fragment below intends to initialize each array element with the value of its index. It contains an error. Identify it.

```
int size = 99;
int* myArray = new int[size];

for (int ix = 1; ix <=size; ++ix)
    myArray[ix] = ix;
```

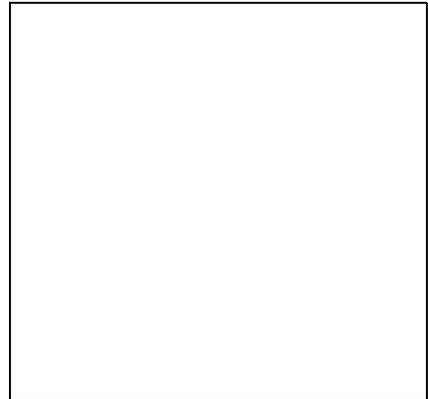
5. What is the exact output of the following program?

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

void mystery(int, int&);

int main()
{
    int a = 3, b = 6;
    cout << "a = " << a << ", b = " << b << endl;
    mystery(a, b);
    cout << "a = " << a << ", b = " << b << endl;
    return 0;
}

void mystery(int a, int& b)
{
    a++;
    b--;
    cout << "a = " << a << ", b = " << b << endl;
}
```



6. Write a **recursive** function that reads in strings from the user and then prints them in reverse order. [Note: recursion **must** be used, and arrays **must not** be used!] The user will signal that the last string has been reached by typing *end*. A typical run of the program might look like this (user input is in bold):

```
Enter some strings: SI204 is great end
great is SI204
```

7. When I run the following program it halts with an error. Why?

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

int fact(int n);

int main()
{
    int n;
    cout << "Enter a number: ";
    cin >> n;
    cout << n << "! = " << fact(n) << endl;
    return 0;
}

int fact(int n)
{
    if (n == 1)
        return 1;
    else
        return n * fact(n);
}
```

8. Write a program that reads 1000 doubles from a file named `data.txt` (the file format is simply one number per line, and it contains 1000 numbers), asks the user for a range (e.g. `[-50.0,120.5]`), and prints out the percentage of numbers in that range. After printing the percentage, the program should prompt the user for a new range and print a percentage for that range, repeating the process until the user enters `Q` instead of a range. A typical run of the program might look like:

```
Enter range: [0.0,0.1]
0% in range!

Enter range: [-100000,100000]
100% in range!

Enter range: Q

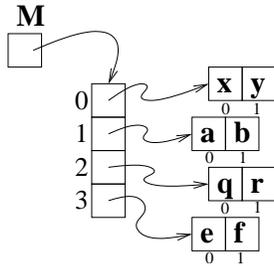
Goodbye!
```

9. Implement the function with prototype

```
void transpose(char **M, int r, int c);
```

that takes M, a 2D array of characters with *r* rows and *c* columns, and prints out its *transpose*. Here's what *transpose* means: The first row of the transpose is the first column of M, the second row of the transpose is the second column of M, etc. The picture below provides an example:

If `char **M`
is the array shown below



Then `writetranspose(M,4,2)`
should write the output shown below
to the screen.

x	a	q	e
y	b	r	f