EXAM 2

(**9:05AM – 12:05AM** on December 6, 2023)

1. Please be aware that you may NOT leave the room for ANY reason during the exam. Please use the bathroom before coming to the final exam.
2. You cannot unstaple or remove any of the pages from the exam. There are two pages attached to the end of the exam that you can use as scratch paper and can't remove them as well.
3. No electronics such as phones, laptops, tablets, smart watches, etc. or any outside resources are allowed.
4. Any form of cheating or communication with other students will result in an automatic zero as your score.

Question	Points	Points Received
1)	14	
2)	40	
3)	14	
4)	12	
5)	20	

Total: _____

1) Given the following code:

```
1  #include<iostream>
2  using namespace std;
3  void keepTrack(int&, char);
4
5  int main()
6  {
7      int counter = 2;
8      char letter = 'a';
9      keepTrack(counter, 'a');
10     cout << "Printing... " << counter << ' ' << letter << endl;
11     letter = 'A';
12     keepTrack(counter, letter);
13     cout << "Printing... " << counter << ' ' << letter << endl;
14     return 0;
15 }
16
17 void keepTrack(int& x, char g)
18 {
19     if (g >= 'A' && g <= 'Z')
20        x++;
21     else
22        x = 0;
23
24     g = 'a';
25     cout << "End of Function... " << x << ' ' << g << endl;

26 }
```

a) (8 points) What is printed to standard output?

b) (2 points) List the reference parameter(s) in the function `keepTrack`:

c) (2 points) Which line(s) contain(s) a function call? (Answer the line number and copy the function call statement.)

d) (2 points) Which line has a function prototype? (Answer the line number and copy the prototype statement.)

2) Given the following declarations (assume that all variables have values, although we do not know what they are!)

```
int n, p;
char keyStroke;
int miles[200], distance[200];
char summerMessage[20] = "CSC126 SPRING!";
double quarterly[16][24];
```

a) (8 points) Write the C++ code that counts and prints **how many values** in `quarterly` are between 0 and 20 (inclusive)**.**

b) (8 points) Write the C++ statements that will print only those elements of miles where the value of the corresponding element in distance is **divisible by** the one in miles.

c) (8 points) Write the C++ statements that swaps the values of miles[0] and distance[0].

d) (8 points) Write the C++ statement that prompts the user to enter a value into the character `keystroke`. If the character is alphabetic, your code prints out all letters in the alphabet up to and including the letter `keystroke`. If the character is not alphabetic, your code prints it out `keystroke` 40 times.

e) (8 points) What is printed by:

```
int x = strlen(summerMessage);
cout << summerMessage[0] << endl << x << endl;
for (int i = x; i >= 4; i --)
       cout << summerMessage[i] << endl;
```

3) (14 points) What is printed by the following code?

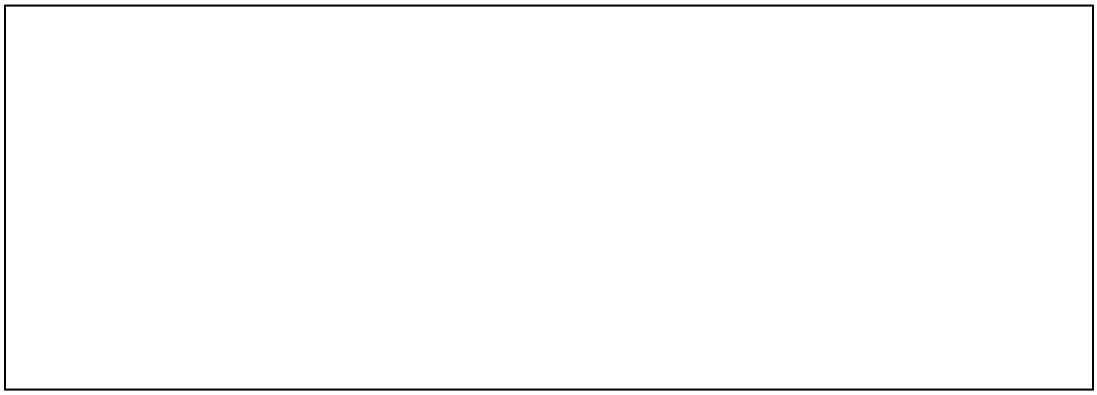
```
#include<iostream>
#include<iomanip>
#include<cmath>

using namespace std;
int main()
{
	double bookPrice[4] = { 118.55, 99.00, 0.99, 66.00 };
	int inventory[4];
	int i;

	cout << fixed << showpoint << setprecision(2);

	for (i = 0; i < 4; i++)
	{
		inventory[i] = i*i;
		cout << '$' << bookPrice[i] << ':' << inventory[i] << endl;
	}

	for (i = 0; i < 4; i++)
	{
		if (bookPrice[i] > 60.00)
			inventory[i] = pow(i,3);
	}

	for (i = 0; i < 4; i++)
		cout << '$' << bookPrice[i] << ':' << inventory[i] << endl;

	return 0;
}
```

4) Write the prototype, sample call, and definition (header and body) of a function **findDouble**. This function takes three integer parameters and **returns 0** if none of the parameters are equal to each other, and **returns 1** if any of the parameters are equal to each other.

a) (2 points) Prototype:

b) (2 points) Sample call (declare any variables, if needed.)

c) (8 points) Function definition:



5) (20 points) Write a full program, including comments!

Suppose you have a file `accounts.txt` that has many lines that keep track of all your customers, including usernames, how many years since account opened and total that the user spent at your site last year.

The following shows the first few lines of the file:

mysillytie	2	30.00
Bgreen113	4	85.00
bestfreind	6	1100.00
surepost	3	4.50
studentwonder	1	360.00

…

The first line means that the the customers' username is mysillytie, this customer has been with the company for 2 years and spent $30.00 last year.

NOTE: WE DO NOT KNOW HOW MANY LINES THERE ARE IN THE FILE.

Write the C++ program (with comments) that reads each line from the file, prints them out (to the screen) with a column that states if the user is a stable customer.
A stable customer is a customer who was with the company more than 2 years and spent more than $30.00 last year.
Write a function that returns `'Y'` if the customer is stable and `'N'` otherwise.

Your program also prints out (to the screen) how many of our customers are stable. Your program also prints the total amount that all customers spent last year.

If the file has **ONLY** the lines above, the output would be:

USERNAME	YEARS	SPENT IN 2022	STABLE?
mysillytie	2	30.00	N
Bgreen113	4	85.00	Y
bestfreind	6	1100.00	Y
surepost	3	4.50	N
studentwonder	1	360.00	N

```
2 of the customers are stable.
Total spent by all customers is $1579.50
```

ANSWER HERE:

Scrap paper (Please don’t remove it)

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