**SPRING 2025 CSC126 DEPARTMENTAL FINAL EXAM**

(**9:00AM – 11:30AM** on December 21, 2025)

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. Do not remove them from the exam.
3. No electronics such as phones, laptops, tablets, buds, smartwatches, etc. or any outside resources are allowed during the exam.
4. Any form of cheating or communication with other students will result in an automatic zero as your score.
5. Sign in with your photo ID when you hand your final exam to one of the proctors.

|  |  |  |
| --- | --- | --- |
| Question | Points | Points Received |
|  | 14 |  |
|  | 14 |  |
|  | 40 |  |
|  | 12 |  |
|  | 20 |  |

Total: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Given the following code, answer questions a-d below:
2. #include<iostream>
3. using namespace std;
4. void keepTrack(int&, char);
5. int main()
6. {
7. int counter = 2;
8. char letter = 'a';
9. keepTrack(counter, 'a');
10. cout << "Printing... " << counter << ' ' << letter << endl;
11. letter = 'H';
12. keepTrack(counter, letter);
13. cout << "Printing... " << counter << ' ' << letter << endl;
14. return 0;
15. }
16. void keepTrack(int& x, char g)
17. {
18. if (g >= 'D' && g <= 'Z')
19. x++;
20. else
21. x = 0;
22. g = 'b';
23. cout << "End of Function... " << x << ' ' << g << endl;
24. }
    1. (10 points) What is printed to standard output?
    2. (2 points) List the **reference parameter**(s) in the function keepTrack:
    3. (2 points) Which line(s) contains a **function call**? (Provide the line number and copy the function call statement.)

1. Write the prototype, a sample call, and the full definition (header and body) of a function named sumMultiples**.**

The function returns an int that is the sum of all multiples of 3 from 1 up to a given limit number.  
It takes one int parameter representing the upper limit.

For example, if the argument (parameter) is 10, the function should return 18 (3 + 6 + 9).

You must use a **loop** inside the function to calculate the sum.

a) (2 points) Prototype:

b) (2 points) Give a sample call to the function.

c) (10 points) Function definition:

1. Answer the following questions:

* 1. (10 points) Given the following declaration.

double prices[9];

Assume the array contains values, **but you do not know them**.

Write code to **print** all the elements in prices that less than $1.00. Also print **how many** are below $1.00

**Example Output:**  
If the array contains .20 .75 1.50 20.00 18.00 2.00 .25 .05 40.00 your code should output:

.20 .75 .25 .05

4 are below $1.00

* 1. (10 points) Write the C++ code that asks the user to enter a password. The correct password is "OpenAI2025". The user has up to **5 attempts** to enter the correct password.
* If the correct password is entered, display: "Access granted" and stop.
* If the password is wrong, display: "Incorrect password" and try again.
* After 3 incorrect attempts, display: "Account locked. Contact support."

**You must use a loop to solve this problem.**

You may start with this code.

string correct\_password = "OpenAI2025";

int attempts = 0;

* 1. (10 points) Given:

char initials[6][4]; //assume that initials has values in it

Write code that prints **only the first row** of the array.  
Each element should be printed on its **own line**.

**You must use a loop to access and print the values.**

* 1. (10 points) What is printed by:

//input is A 15 B 12 A 2 A 16 B 3

char val;

int count;

int voteA = 0, voteB = 0;

while (voteA < 20 && voteB < 20)

{

cin >> val >> count;

if (val == 'A')

voteA += count;

else if (val == 'B')

voteB += count;

cout << "Vote A: " << voteA << " Vote B: " << voteB << endl;

}

1. (12 points) What is printed by the following code?

int points[4] = { 8, 3, 0, 12 }, sum = 0;

int i;

for (i = 0; i < 4; i++)

cout << points[i] << '\*';

cout << endl;

for (i = 0; i < 4; i++)

{

sum += points[i];

cout << "Sum of " << i + 1 << " rounds " << sum << endl;

if (points[i] == 0)

{

cout << "Shutout!" << endl;

points[i] = 1;

}

}

cout << "Total points in game: " << sum << endl;

for (int i = 0; i < 4; i++)

cout << points[i] << endl;

1. (18 points) Write a full program, including comments (2 comments is enough for this code)! You do not need arrays for this code.

//Reminder of some code:

ifstream inFile;

inFile.open("graduates.txt");

Suppose you have a file **graduates.txt**  that keeps track of all the graduates at CSI. Each line has major, a degree and how many students are receiving the degree in 2023. (BS is Bachelor of Science, BS is Bachelor of Arts, MS is Master of Science, etc….)

The following shows the first few lines of the file:

|  |  |  |
| --- | --- | --- |
| Accounting | BS | 89 |
| Accounting | MS | 6 |
| Business | AAS | 24 |
| Business | BS | 34 |
| Cinema | BA | 22 |

…

The first line means that for the major Accounting with a degree of BS (Bachelors of Science) there were 89 graduates. The fifth line means that for the Cinema BA (Bachelors of Art) there were 22 graduates. There are many more lines in the file.

**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 indicating Y if it is a popular Bachelor major and N if it is not. Make sure that you include a function that returns *true* if it is a popular Bachelor major and *false* otherwise. It is a popular Bachelor major if it is a BS or BA degree and there are more than 25 graduates.

Your program also prints out (to the screen):

How many lines are in the file.

How many total Bachelor students were awarded degrees. (BA and BS are both Bachelors degrees)

See the next page for sample output.

If the file has **ONLY** the 5 lines in the sample on the previous page, the output would be:

|  |  |  |  |
| --- | --- | --- | --- |
| **Discipline** | **Degree** | **Students** | **Popular Bachelor?** |
| **Accounting** | **BS** | **89** | **Y** |
| **Accounting** | **MS** | **6** | **N** |
| **Business** | **AAS** | **24** | **N** |
| **Business** | **BS** | **34** | **Y** |
| **Cinema** | **BA** | **22** | **N** |

**We have 5 lines in the file.**

**There are a total of 145 Bachelors graduates.**

Program Here

Program Here

Continue Program Here or Scrap Paper

Scrap paper (Please don’t remove it)