Midterm of CS 135, v2
Mar 18, 2024

Name:	
EmpID:	

1 (30 points) Answer the following questions.

(1) Given `string arr[] = {"Hello", "Hi", "Hey"}`, what is arr[1]?

(2) Declare function **insert**, for an given array `arr` of integers, an integer called `size`, which represents the number of elements in the array, and an integer `capacity`, which represents the capacity of the array, and an integer called `element`. If `size` is smaller than `capacity`, insert `element` to the end of the array and increase the original size by 1, otherwise, do nothing. Return type is void. **Just write function header.**

(3) Write a statement to generate a random int in [-10, 50]. No need to include libraries.

(4) Given `string greeting = "memory";` What is the value for greeting.substr(2, 3)?

(5) What is the value of 1.0 / 2 * 5?

(6) Suppose n is 135, what the value of foo(n)?

```
int foo(int n) {
   int result = 1;
   do {
       result *= n % 10;
       n /= 10;
   } while (n != 0);

   return result;
}
```

(7) Given two double variables a and b, find out the return of b^a. Hint: use pow function, see cheat sheet paper.

(8) What is the output of the following code?

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

int main() {
    int count = 0;
    for (int i = 2; i >= -1; i -= 2)
        count++;

    cout << count << endl;
    return 0;
}
```

(9) What is the output for the following code?

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

void foo(int& a, int b);

int main() {
    int i = 2;
    int j = 6;

    foo(i, j);

    cout << "i = " << i << ", j = " << j << endl;
    return 0;
}

void foo(int& a, int b) {
    a++;
    b*=2;
}
```

(10) Write a condition to represent that char variable *ch* is none of the following: '1', '2', or '3'.

2 (20 points) Answer the following questions.

(1) What is the output of the following code?

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

void show(int height, int width);

int main() {
    show(4, 6);
    return 0;
}

void show(int height, int width) {
    for (int row = 0; row < height; row++) {
        for (int col = 0; col < width; col++)
            if (row >= height/2 && col >= width/2)
               cout << "*";
            else cout << "-";

        cout << endl;
    }
}
```

(2) Define function `all_small_letters`, for an array of chars, return true if **all** its elements are smaller letters ('a' to 'z'), otherwise, return false. **No need to include libraries or define main function.**

Hint: you may use `int islower(int ch)` to test whether a character is lower letter or not.

3 (50 points) Programming exercises

(1) Define function called `tally`, for an array of integers, calculate the number of positive integers, negative integers, and zeros, then return the mininum of these three numbers. For example, if the array has elements 1, 2, -1, -2, 0, the return is 1.

In main function, declare array `arr` with values 1, 2, -1, -2, 0, and call the above function on `arr`. Print out the return. **Just write the statements in main function, no need to include libraries**.

(2) Write code in main to enter strings (may contain spaces) until user enter “exit”. Tally how many string has odd number of characters.

Here is a sample input/output. `Enter a series of strings until enter "exit"` is a prompt. String `try` has odd length.

```
Enter a series of strings until enter "exit"
No, no
try
ABC DE
exit
number of odd strings: 1
```