

CS2400 **Laboratory Assignment #11 and Answer Sheet**
predefined character functions and Arrays (100 points)

Name: _____

In this lab, you are going to get some practice with predefined character functions and one-dimensional arrays.

1. Create a directory call Lab11 inside your 2400/Labs directory.

2. [25 points] Text Processing

- a) Download **text.txt** to your directory from Blackboard
- b) In addition to including `iostream`, #include the `fstream`, `cstdlib` and `cctype` libraries.
- c) Next declare input and output stream variables and open files.
- d) Also do not forget to check whether the file fails to open.
- e) Next read character by character using the **get** function and process them in the following way.
 - lowercase characters convert to uppercase and write the character
 - uppercase characters write the character
 - digit write an asterisk (*)
 - any other character write the character

If your input file is as follows:

```
joe smith    ss#  123-45-6789    dob  10/10/1980
kim Rice     ss#  111-99-3333    dob  11/12/1991
:
```

Output file will be

```
JOE SMITH    SS#  ***-**-*****    DOB  **/**/*****
KIM RICE     SS#  ***-**-*****    DOB  **/**/*****
:
```

f) **Submit your program on Blackboard under Lab 11.**

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Scoring for Text Processing

- 2 points comments (name, date, etc and the introduction to the program)
- 3 point meaningful variable names and document the variables
- 15 points correct output and correct use **of two or more ctype library functions**.
open, check for fail and close files etc.
- 3 points style (indenting)
- 2 points print out of the source code and electronic submission

3. Arrays - (75 points)

Consider the following declarations in the function main

```
const int SIZE = 10;  
  
double a_list[] = {3.2,4.6,7.0,12.5,8.3,9.1};  
  
int  nums[SIZE];  
  
char vowels[] = {'A','E','I','O','U'};  
  
string name[SIZE];  
  
float values[SIZE];
```

Answer the following questions.

1. [4 pts] Size of a_list array is _____
2. [4 pts] Write a statement(s) to print the values of first and the last components of the array a_list.

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3. [10 pts] Use the `sizeof` function in C++ to determine the amount of memory used by the following array declarations. The `sizeof` function can be used in a program in the following way: `cout << sizeof(nums);` The best way to do this is to write a small program. Do not forget to `#include <string>` in your program.

`a_list` _____
`nums` _____
`vowels` _____
`name` _____
`values` _____

Examine the declarations and answer the questions. Answer **Valid** if the statement is valid, **Invalid** otherwise. In either case explain. **In the explanation, if the statement is valid tell exactly what is stored in that location. If invalid, explain what is wrong with the statement.** 4 pts each.

```
const int SIZE = 10;
double a_list[] = {3.2, 4.6, 7.0, 12.5, 8.3, 9.1};
int nums[SIZE];
char vowels[] = {'A', 'E', 'I', 'O', 'U'};
int i = 3;
```

	<u>Valid/Invalid</u>	<u>Explanation</u>
4. <code>a_list[0] = a_list[4];</code>	_____	_____
5. <code>nums = 67;</code>	_____	_____
6. <code>vowels[5] = 'a';</code>	_____	_____
7. <code>a_list[4] = a_list[i/2];</code>	_____	_____
8. <code>nums[3 * i] = 28;</code>	_____	_____
9. <code>nums[5] = static_cast<int>(vowels[0]);</code>	_____	_____

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	<u>Valid/Invalid</u>	<u>Explanation</u>
10. <code>a_list[i] *= 2;</code>	_____	_____
11. <code>cout<< a_list[a_list[4] - 1] <<endl;</code>	_____	_____

Show what values are stored in array `nums` after each of the following codes are executed. **Trace the code by hand.**

12. [5 pts]

```
for (i = 0; i < SIZE; i++){
    nums[i] = i * i;
}
```

Array nums

--	--	--	--	--	--	--	--	--	--

13. [5 pts] What is the output of the following code?

```
for (i = SIZE - 1; i >= 0; i--){
    cout << nums[i] <<" ";
}
cout << endl;
```

output

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14. [5 pts] What is the output of the following code? Trace the code by hand.

```
i = 1;
nums [0]= 1;
do {
    nums[i] = 2 * nums[i - 1];
    i++;
} while (i < SIZE);
```

Array nums

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15. [10 pts] What is the output of the following program? Trace the code by hand.

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

int main()
{
    const int SIZE = 6;
    int graph[SIZE] = {5, 3, 2, 7, 1, 9};

    for (int i = 0; i < SIZE; i++){
        cout << setfill('-') << left << setw(5) << graph[i];
        for (int j = 0; j < graph[i]; j++){
            cout << setw(2) << '*';
        }
        cout << endl;
    }

    return (EXIT_SUCCESS);
}
```