CS 200 – Introduction to Programming

Assignment 1 Part 1

Due Date: Friday September 30 – 11:55 PM

Please keep in mind the following:

- Do not share your code with anyone else. All assignments are to be done individually.
- You must be able to explain any part of your submitted code.
- You must submit the **.cpp** files only. Make sure you name the files as:
  *<roll number>*_A1P*<part number>*Q*<question number>*.cpp
  - For example: 24100116_A1P1Q2.cpp
- Make sure you follow the naming schemes of the .cpp files correctly. Failure to do so will result in getting a **0** in a question.
- No submissions other than via the LMS assignments tab will be entertained.
- For some of the tasks you will be provided with some code. Please **do not** change anything in that code. You are allowed to add more code and additional functions, but you are not allowed to modify the provided code.
- Make sure your code compiles and runs. If a piece of code fails to compile, you'll be given a **0** in that question.
- All submissions will be checked for plagiarism. You are **not** allowed to copy code from the internet.

Question 1: Don't you dare use brackets (15 Marks)

You are given with a .cpp file. You must perform the following tasks:

1. You need to fill in the array (arr) using values from the command line arguments. You may assume that **n** values will always be present (where **n** is the size of the array). You can get the values as:

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stoi(argv[3]), stoi(argv[4]), ...
```

2. Now, write code in the function sortArray() that uses recursion to sort an array. You are allowed to create additional functions for sorting. You are also free to use any sorting algorithm of your choice.
3. The last step is to complete the function search() which tries to find the given number **n** in the array. You must use **recursion**. If **n** is found, it returns **n**. Otherwise, it returns **200**. You can create additional functions for this step too.

Note: You must not change any of the function signatures. You **must** use pointer notation.

Note: Please make sure you **do not** modify any of the given code

Question 2: Hmmm so is this how the number system works? (35 Marks)

You are given with a .cpp file. Your task is to write code that converts the given decimal number to a number with the given base. For example, if the given decimal number is 5, and the required base to which we have to convert to is 2, the output would be 101. Make sure you store your result in the variable convertedNumber.

The program will be run using the command line as:

./filename <decimal_number> <base_to_convert_to>

For example:

./24100116A1P1Q2 6 2

Which would then output the following on the terminal:

The converted number is 110.

The value of base can be any number from 2-36. A number in base 2 (binary) means that it can only be represented using 0s and 1s. A number in base 8 (octal) means that it can be represented using numbers from 0-7 (there will be no 8 and 9). Base 10 means it is decimal numbers. Base 11 means that the numbers can be represented using integers from 0-9 and then the alphabet a. Similarly, base 36 means that each digit can be either an integer from 0-9 or an alphabet from a-z. **You are allowed to use both uppercase or lowercase letters.**

I know you're desperate ☺

Note: Please make sure you **do not** modify any of the given code

Question 3: Number systems – The grand finale 😈 (30 Marks)

You are provided a .cpp file. The program takes in three extra command line arguments: *n*, b_1 and b_2. Your task is to convert the given number n with base b_1 to a new number in a different number system having a base b_2. For example, if n=1101 and b_1=2, and we have to convert it into b_2=10, the output of the program would be 13. Make sure you store the new number in the variable convertedNumber.

The program will be run using the command line as:

./filename b_1 n b_2

For example:

./24100116A1P1Q2 2 1101 10

Which would then output the following on the terminal:

The converted number is 13.

Note: Please make sure you **do not** modify any of the given code

Question 4: My very own calculator ☺ (20 Marks)

You are provided a .cpp file. This program will take in two numbers that can be in any number system and then perform the given arithmetic operation on it. After performing the calculations, it converts the resulting number into an octal (base 8) and stores it in the integer variable result.

The program will be run using the command line as:

./filename b_1 n_1 <operation> b_2 n_2

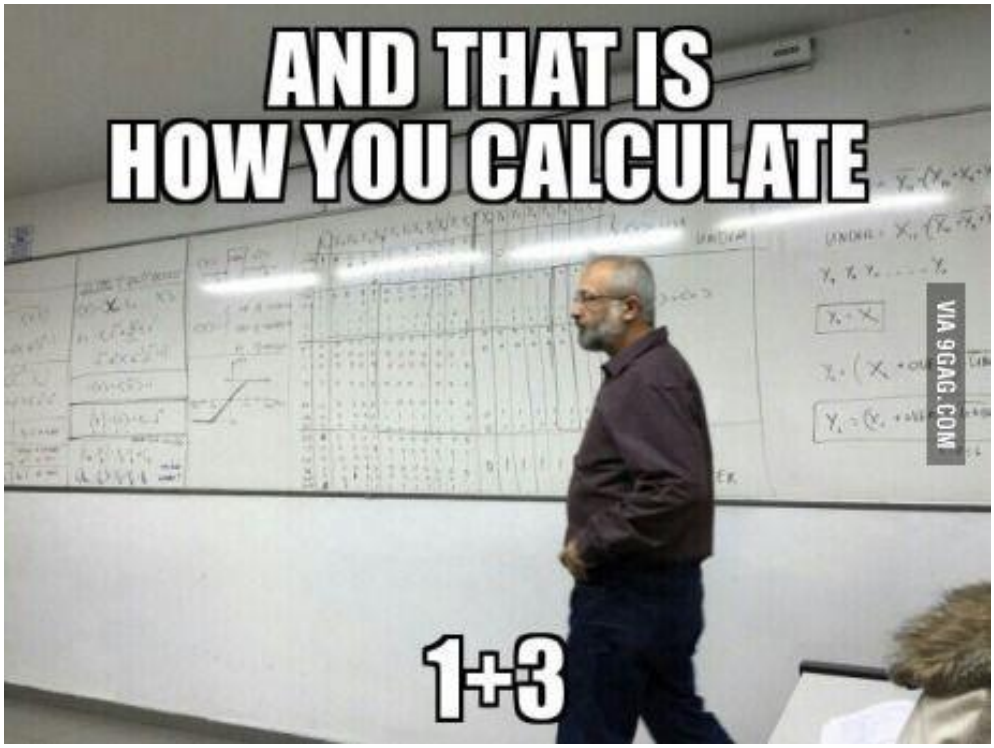
For example:

./24100116A1P1Q2 2 1101 + 10 6

Which would then output the following on the terminal:

The converted number is 23.

The arithmetic operation can be one of these 4: addition(+), division(/), subtraction(-) or multiplication(*).



Note: Please make sure you **do not** modify any of the given code

Good job everyone on finally completing the assignment. I know you all are very smart and talented and I'm very very proud of you ☺

Keep up the good work! 👍

P.S. Meme credits: Hassnain

Note: Please make sure you **do not** modify any of the given code