CS 10, Lab 6

Arrays

Start a new document in Word or a similar program. Include the names of both members of your team and any additional information or code as instructed below. At the end of the lab, please email your lab report to cs10labtues@gmail.com or cs10labthurs@gmail.com**with the subject line "CS10 Lab6 lastname lastname", with the last names of both members of your group.**

Part A: Arrays and functions

1. Write pseudocode for a function that finds the minimum element in an array. Check your answer with one of the lab teachers before moving on, and get your lab report signed.
2. Translate your pseudocode from 1 into C++ code. Add a main function that calls the function appropriately. Copy-paste your code into your lab report. Run your code with several outputs to be sure it's right before moving on.
3. First, wrap your head around what this function does:

```
bool isfact(int n){
    bool is=false;
    int fact=1;
    for(int i=1; i<n+2; i++){
        if(fact==n)
            is=true;
        fact=fact*i;
    }
    return is;
}
```

   Using this function, write another function void factarr(int a[], bool fact[], int size), in pseudocode, that determines the factorials in your array. When your function call is over, the array fact should be a parallel array to a where each spot holds true if the corresponding element of a is a fact, and false if it's not. Check your answer with one of the lab teachers before moving on, and get your lab report signed.

4. Translate your pseudocode from 3 into C++ code. Add a main function that calls the function appropriately. Copy-paste your code into your lab report. Run your code with several outputs to be sure it's right before moving on.

Part B: A flashcard program

In this part of the lab, we will implement some of the programs described in the paper "Long-term memory, sleep, and the spacing effect."

1. Here http://math.scu.edu/~linnell/cs10resources/lab6psych.txt you will find the pseudocode for a program that prompts the user to enter the English translation of Spanish words. The program will prompt the user with randomly selected words, **until the user gets each word correct twice.** Spend some time understanding how the pseudocode does this, then translate this pseudocode into C++. Please use the variable `size` when declaring your arrays. Use srand appropriately. Copy-paste your code into your lab report. Run your code with several outputs to be sure it's right, check your answer with one of the lab teachers before moving on, and get your lab report signed.

---------Minimum stopping point----------

In part 5-9, the maximum size of n is 50. You are provided with a main function which will disallow input that is too large

5. For part 5 you will write pseudocode for a function, `void factors(int n, int facts[])` to populate the array `facts` to indicate what the factors of `n` are. For instance, since the factors of 6 are 1, 2, 3, and 6, the `facts` array for 6 would be (Note: You don't need to fill the cells larger than n):

Spot	Value
0	0
1	1
2	1
3	1
4	0
5	0
6	1

Remember: Arrays are always call by reference parameters!

6. Translate your pseudocode from 5 into C++ code. Write a sensible main function to teste your code; make your array of size 50, that will be big enough for our purposes. Copy-paste your code into your lab report. Run your code with several outputs to be sure it's right before moving on.

7. For part 7, you will write pseudocode for a function `bool isperfect(int n, int factors[])` that returns true if n is perfect, and false if it isn't. Mathematically, a number is perfect if it equals the sum of its factors (not including itself). So 6 is perfect because 1+2+3 = 6. However, 4 is not perfect because the factors of 4 are 1 and 2, and 1+2 != 4.

8. Translate your pseudocode from 7 into C++ code. Use the main function below. Copy-paste your code into your lab report. Run your code with several outputs to be sure it's right before moving on.

```
int main(){
    int a[50];
    int test = 0;
    cout<<"Enter a number!"<<endl;
    cin>>test
    if(test>=50){
        cout<<"Sorry!  Can't test numbers that high!
    }
    else{
        factors(test, a);
        if(isperfect(test,a))
            cout<<"Perfect!"<<endl;
        else
            cout<<"Imperfect.  :("<<endl;
    }
    return 0;
}
```