CmpE 260 - Principles of Programming Languages
Spring 2019
Assignment 2

due: 27.05.2019 - 11:59

Question 1 [50 points]

Consider the following `C++` like program with pass-by-value parameters:

```cpp
int n = 50; // global
print_plus_n(int x) {
    cout << x + n << endl;
}
increment_n() {
    n = n + 1;
}
main() {
    int n;
    n = 10;
    print_plus_n(n);
    increment_n();
    cout << n << endl;
    print_plus_n(n);
}
```

Briefly explain how and write the output of the program assuming that the language uses:

a) Static scoping

b) Dynamic scoping

Note: cout is a function to print to console. As an example, the following line

```cpp
cout << "Hello world" << endl ;
```

prints the string "Hello world" to console and `endl` is the end-of-line character which moves the cursor to next line.

Question 2 [50 points]

Consider the following `C++` like pseudo-code. Briefly explain how and write the output of the program assuming that the program is executed with each of the following parameter passing methods.

a) Pass-by-value

b) Pass-by-reference

c) Pass-by-name

```cpp
void function1(int a, int b, int c) {
    int d = -1;
    while(a > 0) {
        c = c / b;
        a = a + d;
    }
}
void function2(int a, int b) {
    int c = b;
    b = a;
    a = c;
}
int main() {
    int x = 2;
    int y = 10;
    int z = 1500;
    cout << x << "," << y << "," << z << endl;
    function1(x,y,z);
    cout << x << "," << y << "," << z << endl;
    function2(x,z)
    cout << x << "," << y << "," << z << endl;
}
```

Love, work, and knowledge are the wellsprings of our lives, they should also govern it.
(Wilhelm Reich)