1) Consider the following program with pass-by-value parameters:

```c
main()
    f1(int x){
        return x + y;
    };
    f3(int x){
        int y = 5;
        f2(int x){
            x = x + 3;
            return f1(y);
        };
        y = f2(y);
        x = f1(y);
        return x-y;
    };
    int y = 1;
    int x = 20;
    x=f3(x);
    y=f1(y-1);
}
```

Beginning from the execution of `main`, give the values of the variables of the program at each line assuming that the language uses:

a) Static scoping
b) Dynamic scoping

da) Static scope:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Main_x</th>
<th>Main_y</th>
<th>f1_x</th>
<th>f1_y</th>
<th>f2_x</th>
<th>f2_y</th>
<th>f3_x</th>
<th>f3_y</th>
</tr>
</thead>
<tbody>
<tr>
<td>int y=1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>int x=20</td>
<td>20</td>
<td>1</td>
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</tr>
</tbody>
</table>

db) Dynamic scope:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Main_x</th>
<th>Main_y</th>
<th>f1_x</th>
<th>f1_y</th>
<th>f2_x</th>
<th>f2_y</th>
<th>f3_x</th>
<th>f3_y</th>
</tr>
</thead>
<tbody>
<tr>
<td>int y=1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) See [http://www.cmpe.boun.edu.tr/~gungort/informationstudents.htm](http://www.cmpe.boun.edu.tr/~gungort/informationstudents.htm) for general information about the assignments and the course policy.

2) The sole purpose of this assignment is to familiarize you with the processes involved in answering questions related to programming languages. Thus, please work on them by your own.
2) Consider the following C++ like pseudo-code. Write the outputs of the program assuming that the program is executed with each of the following parameter passing methods.

a) Pass-by-value
b) Pass-by-value-result
c) Pass-by-reference
d) Pass-by-name

```cpp
void function1(int a, int b, int c) {
    c = 1;
    while (b > 0) {
        c = c * a;
        b = b - 1;
    }
}

void function2(int a, int c) {
    int b = a;
    a = c;
    c = b;
}

int main() {
    int a = 3;
    int b = 4;
    int c = 5;
    cout << a << "", "<<c<<endl;
    function1(a, a, c);
    cout << a << "", "<<c<<endl;
    function2(a, c);
    cout << a << "", "<<c<<endl;
}
```

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