

Lab 1 Solution

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1. Problem One (CaC 1.11)

1.a Solution

MOSS is a plagiarism detection system primarily designed for computer science professors to detect if 2 sets of code share too much in common with each other. MOSS uses 3 primary properties for "copy-detection." First it does not take spaces or variable name changes into account, so it is able to find similarity even if words are not the same. Second, meaningful results are gathered by finding longer segments that share code, meaning a single matching word or statement would not weigh as heavily on the algorithm when looking for similarity. Third, MOSS detects matching code no matter where it is found in the program, it could be segmented and broken up and still detect the copied code.

2. Problem Two (CaC 3.1)

2.a Solution

```
1 public class MyFirstJavaProgram {
2
3 main(){
4     const float payment = 384.00;
5     float bal;
6     int month = 0;
7     bal=15000;
8     while (bal>0){
9         printf("Month: %2d Balance: %10.2f\n", month, bal);
10        bal=bal-payment+0.015*bal;
11        month=month+1;
12    }
13 }
```

The above text put into a C compiler will produce the tokens:

```
{ main, (, ), { }
{ const, float, payment, =, 384.00, ; }
{ int, month, =, 0, ; }
{ bal, =, 15000, ; }
{ while, (, bal, >, 0, ), { }
{ printf, (, ", Month: %2d Balance: %10.2f, ", ', ', month, ', ', bal, ), ; }
{ bal, =, bal, -, payment, +, 0.015, *, bal, ; }
{ month, =, month, +, 1, ; }
{ } }
```

Extra information needs to be returned for identifier tokens. All other tokens are set in the grammar, while each identifier is separate and points to a different value, so more information must be sent back other than just that it is an identifier.

3. Problem Three (Dragon 1.1.4)

3.a Solution

C has a few advantages as a language. When it comes to using it as a target language for a compiler the key things it brings to the table are, it is low level and easy to generate, it can be written independent of specific architecture, and it is well optimized. On top of all of this it is also widely available, so it being the target language makes it much more accessible.

4. Problem Three (Dragon 1.6.1)

4.a Solution

```
1 int w, x, y, z;  
2 int i = 4; int j = 5;  
3 {  
4     int j = 7;  
5     i = 6;  
6     w = i + j;  
7 }  
8 x = i + j;  
9 {  
10    int i = 8;  
11    y = i + j;  
12 }  
13 z = i + j;
```

Find the value of the variables w, x, y, and z:

w = 13 (i is changed to 6, new var j is 7)

x = 11 (i was changed to 6, but original j is still 5)

y = 13 (new var i is 8 and original j is still 5)

z = 11 (original i was changed to 6 and original j is still 5)