Final Project

Team Members:

1. Sushil Pandey
2. Tejendra Khatri
3. Ankur Lamichhane

Description:

This program deals with the translation of type-checked AST to a new three-address-code AST. Once, it is done, the class unparser takes the new AST and produces three address code of the code that is written in the input.txt file. IfFalse and Goto statements have been produced and unparser has been modified to support these new statements.

Unparser displays the result in two different forms:

1. Writes the three address code in a text file called output.txt
2. Displays the three address code in the terminal itself

The different scenarios with the three address code produced are as follows:

Inputs: Outputs:

```
{
int a ;
int b ;
a = 0;
b=a;
}
```

```
dy7131ox@smaug:~/Desktop$ java intercode/Main
L1: a = 0
L2: b = a
L3:
dy7131ox@smaug:~/Desktop$
```

```
1    {
2      int a ;
3      int b ;
4      a = 0;
5      b = a;
6      a = a/5;
7    }
8
```

```
dy7131ox@smaug:~/Desktop$ java intercode/Main
L1: a = 0
L2: b = a
L3: t1 = a / 5
     a = t1
L4:
dy7131ox@smaug:~/Desktop$
```

```
a = 0;
if(a!=10){
    a = 10;
```

```
dy7131ox@smaug:~/Desktop$ java intercode/Main
L1: a = 0
L2: ifFalse a != 10 goto L4
L3: a = 10
L4:
dy7131ox@smaug:~/Desktop$
```

```
a = 0;
for(;;)
{
    a = a+1;
}
```

```
dy7131ox@smaug:~/Desktop$ java intercode/Main
L1: a = 0
L2: t1 = a + 1
    a = t1
L3: goto L2
L4:
```

Here is an infinite loop. As seen in the three address code produced, it never reaches to L4. It also goes back to L2 to execute the body of the loop.

```
a = 0;b=0;
for(a=1;a<=12;a=a-1)
{
    b = b+1;
}
```

```
dy7131ox@smaug:~/Desktop$ java intercode/Main
L1: a = 0
L2: b = 0
L3: a = 1
L4: ifFalse a <= 12 goto L8
L5: t1 = b + 1
    b = t1
L6: t2 = a - 1
    a = t2
L7: goto L4
L8:
```

```
c=17.8;
d = 15;
a = 0;b=0;
d = a*b/c-(c-d)+a;
```

```
dy7131ox@smaug:~/Desktop$ java intercode/Main
L1: c = 17.8
L2: d = 15
L3: a = 0
L4: b = 0
L5:    t1 = a * b
    t2 = t1 / c
    t3 = c - d
    t4 = t2 - t3
    t5 = t4 + a
    d = t5
L6:
dy7131ox@smaug:~/Desktop$
```

Modifications to the grammar:

Note: int and float variable has to be assigned a num or float first before using it to make it initialized. For eg, int a;int b; a= 0; b=a; a=b; the statement a= b won't work because it will consider b as not being initialized even though b is assigned a. b has to be assigned a number before assigning a to make it work.

A new class Intercode.java has been added, which extends ASTVisitor class for translating the type-checked AST to a three address code converted AST.