CS 5722, Fall 2014 **Homework 13**
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1a

The equation is:

$$\begin{aligned}
f(x) &= x + ((x + (((x + (cos(x - x) - (x - x))) * x) * x)) * x) \\
&= x + ((x + (((x + (cos(0) - 0)) * x) * x)) * x) \\
&= x + ((x + (((x + 1) * x) * x)) * x) \\
&= x + ((x + ((x^2 + x) * x)) * x) \\
&= x + ((x + x^3 + x^2) * x) \\
&= x + (x^2 + x^4 + x^3) \\
&= x^4 + x^3 + x^2 + x
\end{aligned}$$

b

The only unnecessary term is $(-XX)$ that is subtracted from the cosine term. The subtree $(-(COS(-XX))(-XX))$ could simply be $(COS(-XX))$.

2

3a

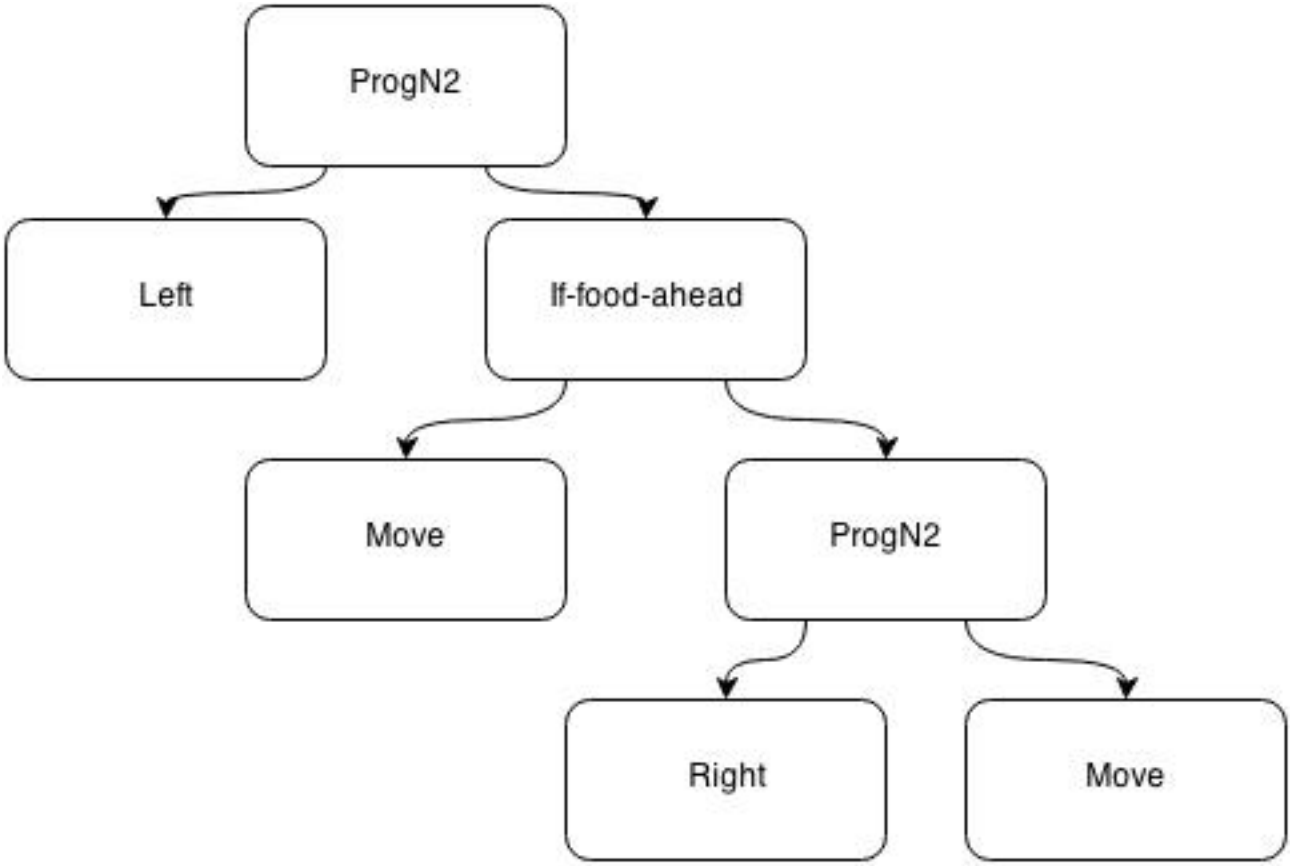
The summary of the Santa Fe policy from lecture is:

1. Move ahead if there is food
2. If no food turn left and move ahead if food
3. Otherwise turn right twice and move ahead if food
4. Otherwise turn left and move even though there is no food

This is not optimal for the Los Altos trail. The main reason is that it needs the ant to be directly next to a piece of food for it to change its direction. This does not happen at locations 116 an 136 on the Los Altos trail. At these locations the Santa Fe policy would cause the ant to continue moving downward, it would never turn to continue to follow the path.

b

4



5a

1 piece of food is eaten, the one at the start. The 10 steps taken are:

[Move, Move, Move, Move, Move, Move, Move, Move, Move, Nothing]

b

3 pieces of food are eaten. The 10 steps taken are:

[Right, Left, Move, Right, Move, Move, Right, Left, Move, Right]