

# SI 413 Fall 2021: Homework 7

Due Monday, October 18

Your name:

Citations and collaborators:

Comments, suggestions, or questions for your instructor:

Fill out the first row of the table on a 0-5 scale before turning in.

This rubric is also available on the website under “Admin”:

- **5:** Solution is completely correct, concisely presented, and neatly written.
- **4:** The solution is mostly correct, but one or two minor details were missed, or the presentation could be better.
- **3:** The main idea is correct, but there are some significant mistakes. The presentation is somewhat sloppy or confused.
- **2:** A complete effort was made, but the result is mostly incorrect.
- **1:** The beginning of an attempt was made, but the work is clearly incomplete.
- **0:** Not submitted.

Problem	1	2	3	4	Total
Self-assessment					
Final assessment					

# 1 CFSM Drawing

The following grammar represents the language of all “even” records, where there are an equal number of wins and losses:

$S \rightarrow even$   
 $even \rightarrow even\ WIN\ even\ LOSS$   
 $even \rightarrow LOSS\ even\ WIN\ even$   
 $even \rightarrow \epsilon;$

I want you to draw out the CFSM for this grammar. Remember that this process really has 3 steps:

- 1) Write out all the LR items (the things with bullets)
- 2) Generate the Nondeterministic CFSM using the two kinds of transitions
- 3) Generate the actual (deterministic) CFSM by combining states

But I'll only require you to show the result at the last step, that is, the final CFSM. As a hint, this CFSM has exactly 9 states.

## 2 CFSM Conflicts

Answer the following regarding the CFSM that you came up with from the previous question:

a) Give an example of a conflict in the CFSM. Identify the state and say whether it is a shift-reduce or reduce-reduce conflict.

b) Is this grammar SLR(1)? Why or why not?

c) (OPTIONAL enrichment) Give an SLR(1) grammar for this language, or prove that none exists.

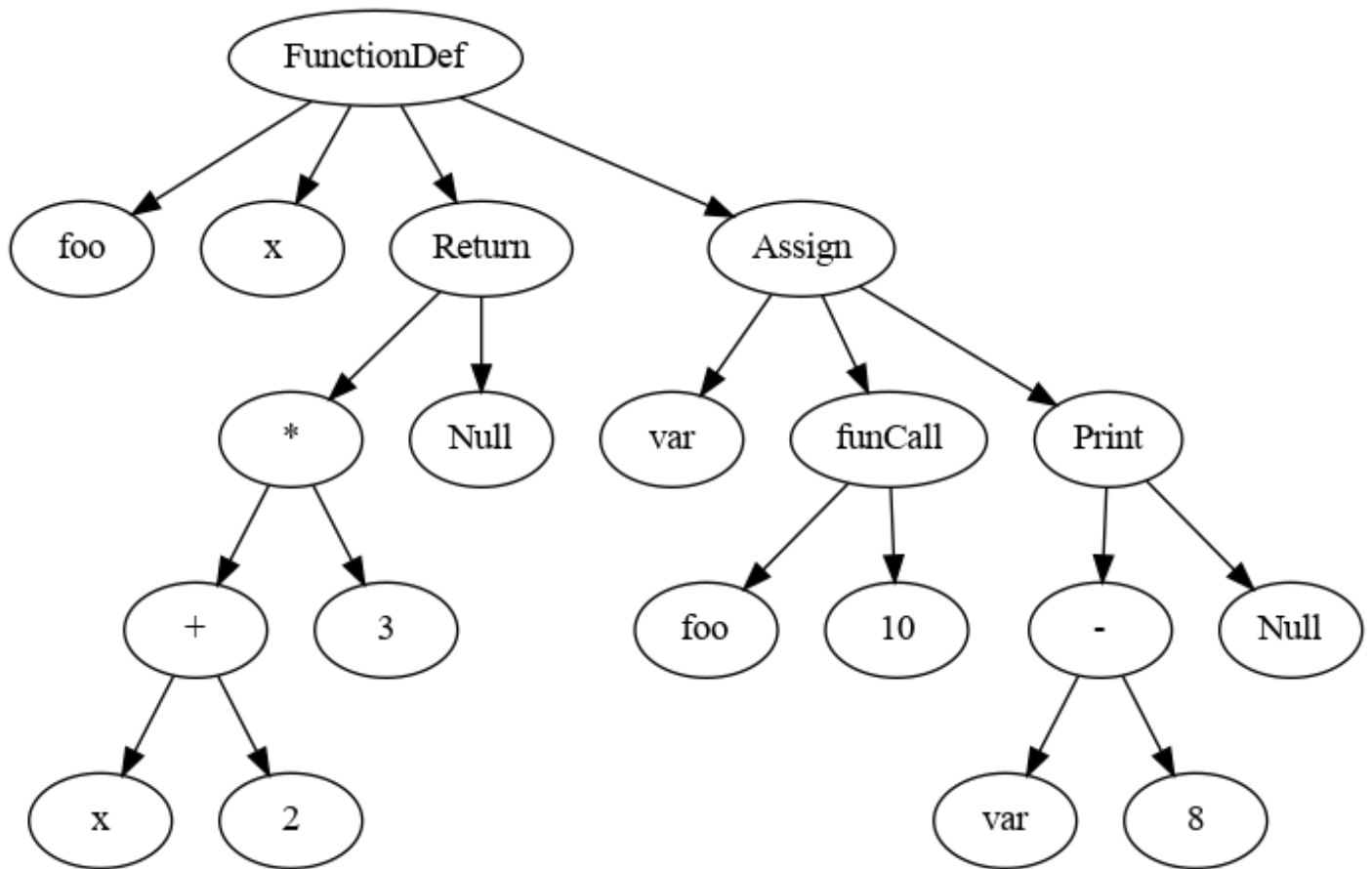
### 3 Draw an AST

Here is a program written in Python. Draw its AST.

```
x = 10
while x > 0:
    print(x)
    x = x - 3
print("done")
```

## 4 Undraw an AST

Write a program in the language of your choosing that would generate the following AST:



(Be sure to specify which language you have chosen!)