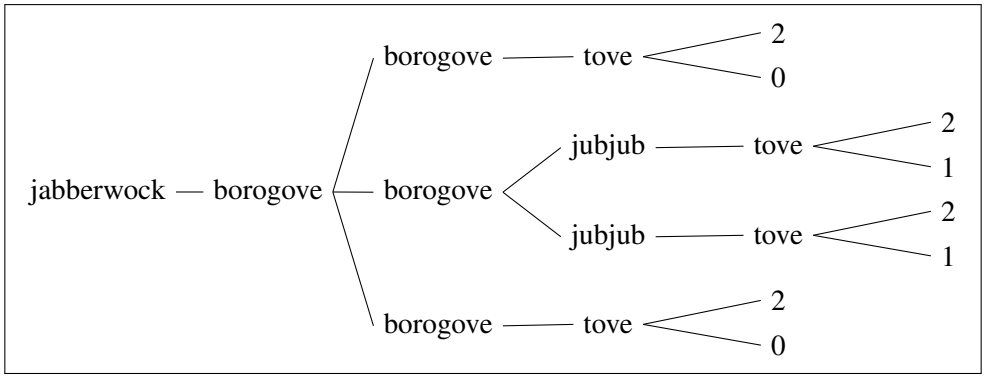
Jabberwocks

CSCI 312 Homework 4

January 25, 2023

- A **jabberwock** is a borogove.
- A **borogove** is either:
  - two jubjubs
  - three borogoves
  - a tove
- A **jubjub** is either:
  - a tove
  - two borogoves
- A **tove** is two integers.

Typical jabberwocks are shown below and above, right.



Types: Write a definition of jabberwocks, borogoves, and toves in Racket language plai using `define-type`.

Conversion to and from lists: Use your datatype to write a procedure that converts jabberwocks to lists. For example:

```
> (pretty-print (jabberwock-to-list test-case))
'(jabberwock
  (borogove
   ((borogove (tove 2 0))
    (borogove ((jubjub (tove 2 1)) (jubjub (tove 2 1))))
    (borogove (tove 2 0)))))
```

Note that the returned object is just a list of lists, symbols, and numbers.

Also write a procedure `list-to-jabberwock` that takes a list, like the one output by `jabberwock-to-list`, and converts it into a genuine jabberwock.

Counting jubjubs and borogoves: Also write a procedure `fix-toves` that copies the jabberwock, and replaces each pair of tove numbers with the number of borogoves and the number of jubjubs in the path to the root. This is true in the jabberwock shown above.

Test cases: Add enough unit tests to demonstrate all features of your procedures. These can be in the same file or a separate file.

Turn in: Put all your files into a folder `csci312lab04yourname`, zip it, and submit to canvas.