

CS-257L

Nonimperative Programming: Scheme!

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Scheme

and

The Art of Programming

UNM Graduate School Info BBQ

- When: Wed., Feb. 20th at 4 pm
- Where: FEC 141 – and the outside portch
- What:
 - Learn more about graduate school in computer science.
 - Score some free barbeque.

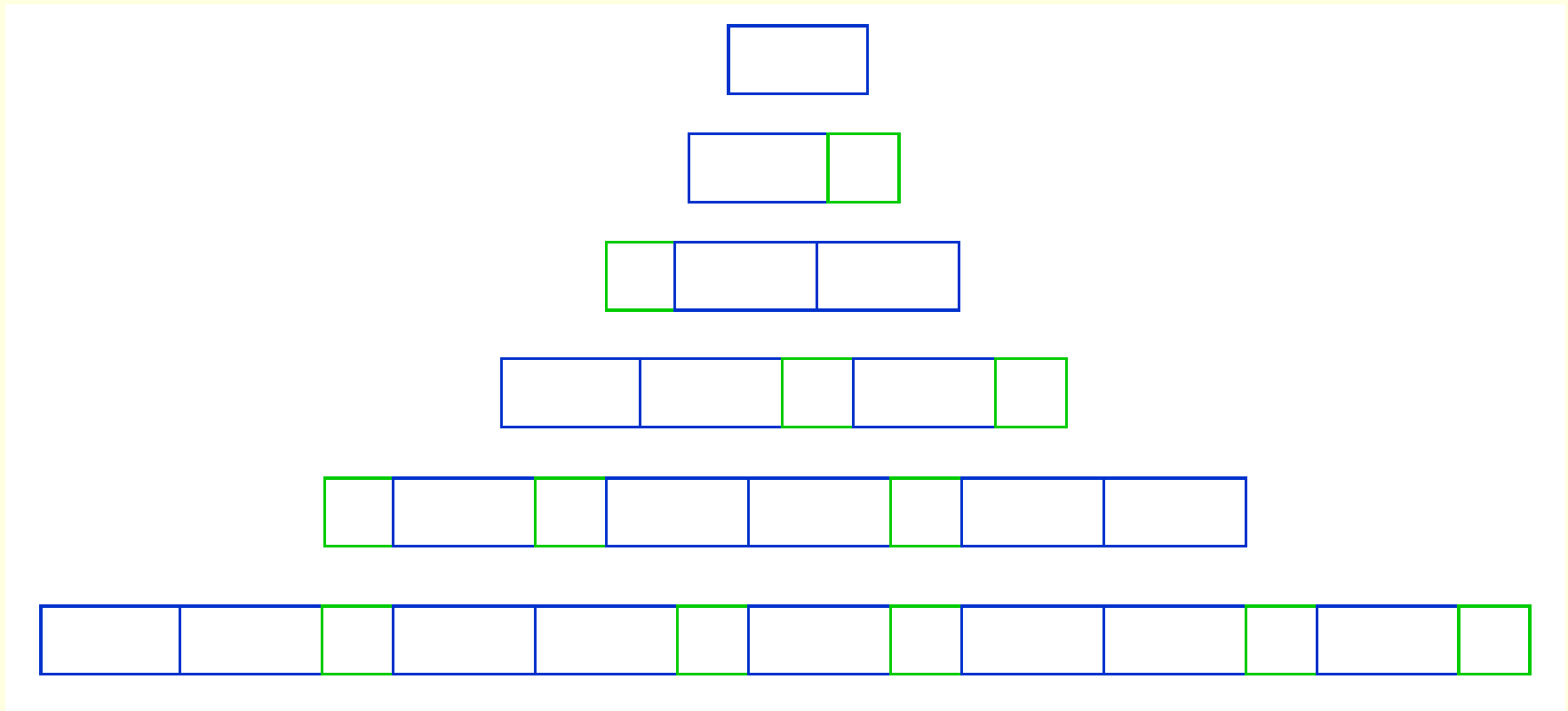
Job Opening

- Sandia National Labs
- Looking for UNM Undergrad
- Very strong Excel skills
- Visual Basic Programming

Blue-Green Algae

Can this pattern be generated by a Context-Free Grammar?

Can it be generated by a Deterministic Context-Free Grammar?



Correct Context-Free Grammar?

Blue-Green Algae pattern

1. **b**
2. **bg**
3. **gbb**
4. **bbgbg**
5. **gbgbbgbb**
6. **bbgbbgbgbbgbg**

- **b** → **bg** | **gb**
- **g** → **b**

Can the grammar generate every generation of the blue-green algae pattern?

Can the grammar generate a string that is NOT in the blue-green algae pattern?

Bad Production:

b → **gb**

Phenotypes and Genotypes

Last week, it was observed that the first b production rule must be used on even generations and the second on odd generations.

$b \rightarrow bg \mid gb$

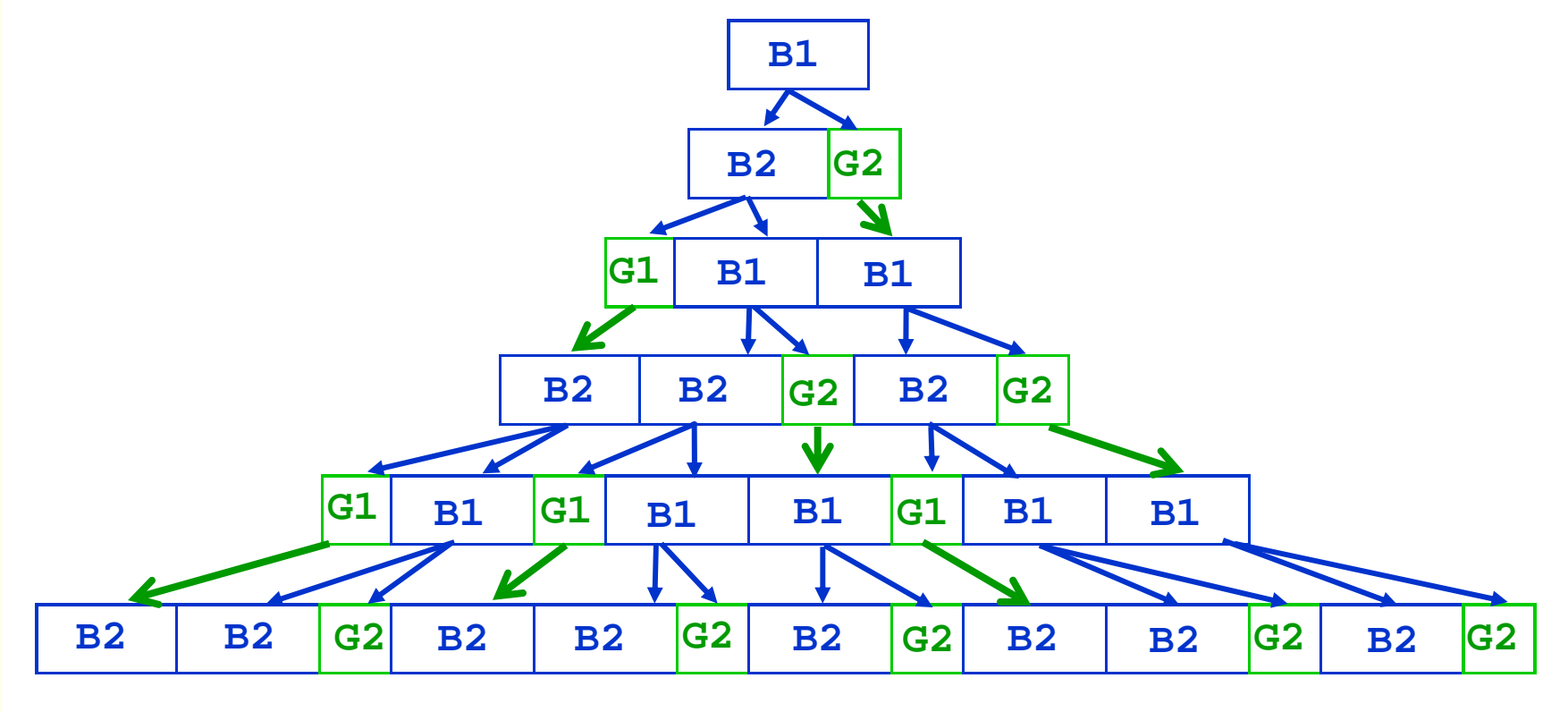
$g \rightarrow b$

The concepts of Phenotypes and Genotypes borrowed from biology can be used to encode the above "odd" and "even" use of rules in a CFL.

Phenotype describes any observed quality of an organism, such as eye color.

Genotype describes the allelic genetic composition such as bb , bB , Bb , or BB for brown or blue eyes.

DCFG for Blue-Green Algae



- B1 → B2G2
- B2 → G1B1
- G1 → B2
- G2 → B1

Scheme and The Art of Programming: Chapter 1: Data and Operators

```
(car (3 5))
```

```
(+ 1 (car '(3 5)))
```

```
(number? (car '(15.3 -31)))
```

```
(symbol? 15)
```

```
(symbol? 'num)
```

```
(boolean? #t)
```

```
(pair? (car '(3 5)))
```

```
(pair? '(3 5))
```

```
(pair? ())
```

```
(procedure? cons)
```