

## Class 2 - Notes

### White Belt Exam

Because of the snow day, the first opportunity to pass the white belt test will be in class this **Wednesday, 27 January**. The test will be a short, in-class, on-paper test that includes some short answer questions and a few questions where you have to understand and write short Python code snippets. The questions will cover these materials:

- Everything covered in [Class 1](#) and [Class 2](#) (today).
- [Chapter 1](#) and [Chapter 2](#) of the coursebook.
- [Udacity cs101](#) Lesson 1 and Lesson 1: Problem Set.
- The [Course Pledge](#).

If you have done and understand all of these before class Wednesday, you should be able to earn your white belt and be able to start working on your yellow belt. Please take advantage of the upcoming scheduled office hours (Tuesday at 3:30, Rice 507), ask questions in the Slack group, and all the on-line resources. If you don't pass the white belt test Wednesday, there will be later opportunities to pass it in different ways (which could involve an oral exam during office hours).

### Notes and Questions

What is Computer Science?

What is a language?

Languages are made of:

- **Primitives** (almost *all languages have these*) – *the simplest surface forms with meaning* (surprisingly it is possible to make a powerful language without any primitives. We will see one before the end of this class!)
- **Means of Combination** (all languages have these) – rules of production (ways to make new surface forms from ones you already have)
- **Means of Abstraction** (all powerful languages have these) – ways to use simple surface forms to represent complicated ones

**Backus-Naur Form** (BNF): A way of describing the surface forms in a language using replacement rules in the form:

*non-terminal ::= replacement*

The rule means whenever you have what is on the left side of the ::=, you can replace it with what is on the right side.

What strings can the following BNF grammar produce?

*Sentence ::= Food Comparator Food*

*Food ::= **Bodo's Bagels***

*Food ::= **Einstein's Bagels***

*Comparator ::= **are better than***

*Comparator ::= **are worse than***

What strings can the following BNF grammar produce?

*Sentence ::= **I like** FoodList*

*FoodList ::= Food*

*FoodList ::= Food **and** FoodList*

*Food ::= **Bodo's Bagels***

*Food ::= **Einstein's Bagels***

When learning a new language, which of *primitives*, *means of combination*, or *means of abstraction* is hardest to learn?

Are there any non-recursive natural languages?

What would happen to a society that spoke one?

*See on-line version for fun links and quotes.*