Recitation 1

Introduction

1.1 Administrivia and Anncouncements

- Welcome to 15-210!
- The course website is http://www.cs.cmu.edu/~15210/. It contains the syllabus, schedule, library documentation, staff contact information, and other useful resources.
- We will be using Piazza (https://piazza.com/) as a hub for course announcements and general questions pertaining to the course. Please check it frequently to make sure you don't miss anything.
- The first (zeroeth?) homework assignment, *SuperLab*, has been released! It's due **Friday at 5pm**, but don't worry – it's short, and only worth 50 points.
- Homeworks will be distributed through Autolab (https://autolab.cs.cmu.edu/). Most homework assignments will be released on Fridays and will be due one week later. You will submit coding tasks on Autolab, and written tasks on Gradescope (https://gradescope.com/).

1.2 Let's Make a Burger

Here's a super pedantic recipe for making a burger (ingredients: patty, lettuce, sliced onion, sliced cheese, burger bun).

1. Prepare patty.
2. Prepare cheese.
3. Prepare bun.
4. Prepare onion.
5. Prepare lettuce.
6. After completing 1 and 2, grill the patty with the cheese placed on top.
7. After completing 3, toast the bun, then lay the two pieces toasted-side up.
8. After completing 6 and 7, place the grilled patty (now covered in melted cheese) on top of the bottom half of the toasted bun.
9. After completing 4, 5, and 7, place the lettuce and onion on top of the top half of the toasted bun.
10. After completing 8 and 9, serve the burger.

Photograph: Nicholas Chen

Task 1.1. *Diagram the dependencies in the given recipe by creating a vertex for each step and drawing a directed edge from x to y if the recipe specifies that x must finish before y begins.*

Task 1.2. *Assuming each step takes unit time, what is the minimum amount of time required to complete the recipe when there are (a) 1 chef, (b) 2 chefs, (c) 5 chefs, and (d) an infinite number of chefs? For each part, justify your answer by specifying a **schedule** which indicates, for each step in the recipe, which chef executes that step, and at what time.*

1.2.1 Work and Span

Task 1.3. *Give a reasonable definition of work and span which are applicable in this context. Using your definition, state the work and span of making a burger.*

Remark 1.4. *An important result in parallel computing is the **greedy scheduling principle**. In the context of recipes, this principle states that, for a recipe with work W and span S, p chefs are able to complete the recipe in at most $\frac{W}{p} + S$ time. We will see a proof of the greedy scheduling principle soon in lecture.*

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