COS351 Lab1: A Real Puzzle

This lab is due before the next class. Your write up should be submitted as a .pdf file, via moodle. Your write up should be on a separate sheet, ***not*** on these pages. (These are your "lab notes".)

Introduction

This is a classic lab in the "experiment and observe" sense of the word. You will be conducting a series of timed experiments and making observations, including some measurements (timings). The basic experiment involves a complex task, constructing a jigsaw puzzle (or else sorting a deck of cards) (hereafter referred to as "the task".)

Baseline

To establish a baseline, the task will be performed by a single individual. If you are not that individual, you should time the task as it is performed. Make any other observations about the performance of the task that are relevant.

How many items were involved in the task? (i.e., how many puzzle pieces) _____

How long did the task take? _____ minutes _____ seconds
Other observations:

Parallel work

Next have the tasked performed by a group of 2 different people (i.e., do not use the person who performed the baseline task); repeat the observations – the time being the most important, but also note any interactions and their effect, positive or negative on completion of the task. Repeat for 4, 8, 16, and 32 people. Use the table on the other side of this page to record your measurements.

Second Task

Time permitting, repeat this sequence for a different size task (e.g., larger or smaller puzzle). Collect the same type of observations, over the same size groupings. Use the second table on the other side of this page for your observations.

Effort vs. Speed-up

How much work was done for each task? Compute (and record in your table) the effort for each task as:

$$Effort = time \times workers$$

How much faster did each task get done? Compute (and record in your table) the speed-up for each task as:

$$Speedup = t_1/t_n$$

where t_n is the wall-clock elapsed time for task with n workers (so t_1 is the time for a task with 1 worker).

Write Up

Now write up your findings. Include the tables of measurements. Then, plot the time (y-axis) vs. people (x-axis), one graph per task size. What conclusions do you draw from this? What do your observations show about "parallel-izing" the task? Does time to completion improve? How is the effect related to the number of workers? Is it a linear relationship? If not, how would you describe it? On another graph, plot the effort and speedups for each table.

Discuss the two task sizes. As we increase the task size (larger puzzle or more decks), how does this affect the parallel efforts? Are the effects the same as with the smaller task? If not, (speculate) why not?

First Task

Group size (people)	Task size (# of items)	Time to Complete (units:_____)	Effort units:	Speedup	Observations
1					
2					
4 8 16 32					

Second Task

Now repeat this sequence for a different size task (e.g., larger or smaller smaller puzzle). Collect the same type of observations, over the same size groupings.

Group size (people)	Task size (# of items)	Time to Complete (units:_____)	Effort units:	Speedup	Observations
1					
2					
4 8 16 32					