CS 250 Fall 2017 Homework 12 SOLUTION & Grading Guide

Due 11:58pm Thursday, Dec. 07, 2017

Submit your typewritten file in PDF format to Blackboard

**Maximum score = 15 points**

1. Fill in the following table for the operation of an SIMD computer on the code  
    where A  
    do X  
    elsewhere do Y  
     
   Some table entries are already filled in to get you started. Wide table entries are intended to hold your comment for each line of code broadcast.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CU  broadcasts  this instruction | PE Enable Stack configuration; T = initial top of stack  Stack top this end 🡪 deeper direction in stack | | | |
| **where A** | T | 🡨 **every PE tests its own A value, regardless of T truth value** | | |
| *Push \** | A’.T | T | A known; Push \* A’ and T | |
| *Push \*\** | A.T | A’.T | T | Push \*\* A and T on stack |
| Do X | A.T | A’.T | T | If (A.T is true) |
| *Pop* | A’.T | T | Pop signals end if | |
| Do Y; | A’/T | T | If(A’.T is true) | |
| *Pop* | T | 🡨 ***again all PEs pop stacks, enabled PEs now same set as initially*** | | |

1. Go to <https://www.top500.org/lists/2017/11/>. Purdue University faculty members pool their research funds each year to buy a single large cluster computer. Twice each year top500.org ranks the fastest computers in the world.  
   Find the Purdue computers in the new Top500 List for November 2017 (the next list will come out June 2018). From the #1 ranked computer plus all Purdue computers in the November 2017 list, state the current ranking, # cores, power consumption, interconnection fabric, and highest ranking ever (machine details are given at links by clicking on the machine name in the ranking table).   
   How many times more cores do these machines have than your computer? How many times larger is their power consumption than the wattage rating on the power supply for your computer?

My laptop is macbook pro

54.5 watt hour lithium polymer battery

61W power adapter

Quad core

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Rank | Number cores | Power KW | Inter Fab | Highest rank | Cores/m | Power/m |
| Conte | 190 | 77520 | 510 | Infiniband Fdr | 41 | 19380 | 7846.2 |
| Brown | 302 | 12960 | 240 | Infiniband Fdr | 50 | 3240 | 3692.3 |
| Sunway taihulight | 1 | 10649600 | 15371 | Custom interconnect | 47 | 3842.75 | 236476.9 |

1. Text exercise 20.2.

90% original direct proportionality

1. Text exercise 20.3

81% of directly proportional to square