Section 1: done

Section 2:

1.1.1) Servers
3) Supercomputer
5) RAM (12)
7) Data centers
9) Low-end servers
11) VHDL
13) Compiler
15) COBOL
17) Instruction
19) Assembly language
21) Application software
23) Systems software
25) High-level language
2) Petabyte
4) Virtual worlds
6) CPU (19)
8) Multicore processors
10) Embedded computer
12) Desktop computers
14) Assembler
16) Machine language
18) Fortran
20) Operating system
22) Bit
24) C
26) Terabyte

1.7 \to 1.0

Ratios: clock 1.28 1.5625 2.64 3.03 10 1.8 0.74
         power 1.2424 1.195 2.06 2.88 2.587 1.9378 0.9223

Geometric means:
   clock \to 2.15107
   power \to 1.61573

2) Largest clock change \to 10 (Pentium Pro \to Pentium 4 Willamette)
   Largest power change \to 2.88 (Pentium \to Pentium Pro)
3) clock ratio \( \Rightarrow \frac{2657}{122.9} = 21.136 \)
power ratio \( \Rightarrow \frac{95}{5.3} = 18.7879 \)

4) power = \( \text{capacitive load} \cdot (\text{Voltage})^2 \cdot (\text{Frequency}) \)
\[ C = \frac{P}{(V^2 \cdot F)} \]

<table>
<thead>
<tr>
<th>Capacitive load</th>
<th>Value (nF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>802.86</td>
<td>10.56</td>
</tr>
<tr>
<td>803.86</td>
<td>10.25</td>
</tr>
<tr>
<td>804.86</td>
<td>7.84</td>
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<td>Pentium</td>
<td>6.1212</td>
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<td>Pentium Pro</td>
<td>13.36</td>
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<tr>
<td>Pentium 4 Willamette</td>
<td>12.2939</td>
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<tr>
<td>Pentium 4 Prescott</td>
<td>18.311</td>
</tr>
<tr>
<td>Core 2 Katiafield</td>
<td>29.4385</td>
</tr>
</tbody>
</table>

5) Voltage Ratios
- \( 5 \rightarrow 3.3 = 0.66 \)
- \( 3.3 \rightarrow 1.75 = 0.53 \)
- \( 1.75 \rightarrow 1.25 = 0.7143 \)
- \( 1.25 \rightarrow 1.1 = 0.88 \)

largest change = 0.93
Pentium Pro to Pentium 4

6) geometric mean = 0.684866
**EEL 4713 Assignment #1**

**Section 3: Lab1.s**

*a) let $a_0 = x = 6$
   $a_1 = y = 4$
   $a_2 = z = 8$

---

$\text{main:}$

- addi $a_0, 0, 6$
- addi $a_1, 0, 4$
- addi $a_2, 0, 8$
- addi $t_0, 0, 0$ (z1 = a1)

$\text{loop1:}$

- add $t_0, t_0, a_0$ (z0 = to + a0)
- addi $t_1, t_1, -1$
- bne $t_1, 0, \text{loop1}$

$\text{loop2:}$

- addi $t_2, 0, 0$
- sub $t_3, t_0, a_2$
- add $t_0, 0, 0$

---

$\text{performs}$

\[
\frac{(6.4 - 8)}{2}
\]

$\text{so let}$

$\text{let } a_0 = x, a_1 = y, a_2 = z, t_0 = r$

---

This code performs the operation:

\[
r = \frac{[z + (x \cdot y)] \cdot [(x \cdot y) - z]}{2}
\]

For $x = 5, y = 4$

\[
r = 256
\]
b) which registers are used to hold operands & results?

I'm assuming for example add $z2, $z0, $z2

\[ \text{operands} \]
\[ \text{result} \]

(also immediate values)

1) for the overall process $z0, $z1, & $z2 hold the
arguments to the function and $z0 stores the result.

Therefore, overall

\[ \text{operands: } z0, z1, z2, -1, -2 \]
\[ \text{results: } z0 \]

2) however, some registers hold intermediate values that are both
result & operands for later instructions

- $z0 holds the result for a multiply but is used as an
  argument for addition & subtraction instructions later
- $z1 & $z3 act as count values for the multiply operations &
  are used as results & operands
- $z2 stores the result of an addition, but is also the operand in
  a multiply later on

When including intermediate steps:

\[ \text{operands: } z0, z1, z2, -1, -2 \]
\[ \text{results: } z0 \]
\[ \text{both: } z0, z1, z2, z3 \]