CS/ECE 347, Spring 1996
Recitation Assignment 4: Computer performance

Assigned: Tue., Feb. 6
Due: Mon., Feb. 12

Answer Sheet

1 2.14

```
A) CPI = 2*.4 + 3*.25 + 3*.25 + 5*.1 = 2.8

B) CPI = 2*.4 + 2*.25 + 3*.25 + 4*.1 = 2.45
```

2 2.15

```
Mbase MIPS = 50Mhz/2.8 = 17.86 MIPS
MOpt  MIPS = 60Mhz/2.45 = 24.49 MIPS
```

3 2.16

```
MOpt is 24.49/17.86 = 1.37 times faster than Mbase.
```

4 2.17

```
.40 * .90 = .36
.25 * .90 = .225
.25 * .95 = .2125
.10 * .85 = .095
    total   .8925

Mcomp CPI = (2*.36 + 3*.225 + 3*.2125 + 5*.095)/ .8925 = 2.81
```

5 2.18

```
Mcomp is 2.8 / (2.81 * .8925) = 1.12 times faster than Mbase.
```

6 2.19

```
.40 * .90 = .36
.25 * .90 = .225
.25 * .95 = .2125
.10 * .85 = .095
    total   .8925

Mboth CPI = (2*.36 + 2*.225 + 3*.2125 + 4*.095)/ .8925 = 2.45

Mboth is (2.8/50) / ((2.81 * .8925)/60) = 1.54 times faster than Mbase.
```

7 2.20

```
competitors machine  6 months 1.22 * Mbase
                     8 months 1.31 * Mbase

MOpt yes, Mcomp no, Mboth yes.
```

8 2.32

```
10sec/(5sec/5 + 5sec) = 5/3 speedup
```

9 2.33

```
100sec/X = 3
X = 100/3 (execution time of the improvement)
y/5 + 100-y = 100/3
3y + 1500 -15y = 500
1000 = 12y
y = 250/3
83.3% would have to be floating-point instructions
```