

ELE 548 Mid Term Test, October 1996
Mark = 10, Time=50 Minutes

1

Consider the following C code:

```
i=0; j=2; k=2000;
while(save[i]==k)
  save[i]=i;
  i=i+j;
```

Assume that save is an array of words starts at address 1000. Registers \$15, \$16, \$17 are used for i, j and k.

1.1 = 3 Marks

Write the above code using MIPS instructions.

1.2 = 1 Mark

How many instructions are executed during running this code.

1.3 = 1 Mark

How many memory data references will be made during the execution.

1.4 = 2 Marks

Find the effective CPI for MIPS assuming that arithmetic instruction takes 1 cycle, data transfer instruction takes 6 cycles, conditional branch takes 1.7 cycles and jump takes 1.2 cycle. Use the above program (running) to calculate instruction frequencies.

1.5 = 1 Mark

Find the rated MIPS assuming that the processor is running at 100 MHz speed.

1.6 = 2 Marks

Find the speed up if system uses a cache to speed the data transfer by 4 times.