All questions count equally. The final grade is the sum of the individual questions. The midterm exam does not count any more.

1. A chip has room for 10 million transistors. According to Moore's law, how many can it have in three years?

2. Name three principles of RISC design.

3. A computer has a 4-stage pipeline. The clock speed is 500 MHz. In every clock cycle, every instruction shifts one stage in the pipeline. A new model has 8 stages and runs at 1000 MHz. How much faster is the new model?

4. Color monitors use the RGB model. Color printers use the CMYK model. Explain the difference between these two models.

5. Draw a 3-to-8 decoder circuit.

6. Using a drawing, show how an asynchronous bus works.

7. Give an IJVM program to compute I = 2*J + 3*K.

8. What is the difference between internal fragmentation and external fragmentation?

9. Windows uses DLL files. Explain what a DLL file is.

10. Explain how a snoopy cache works.