Instructions

Please answer these problems on a piece of blank paper. Write down your answers as clear as possible. Try to make it easy to read. This will help TA to grade your work. After you finish your work, please collect all the papers you have used, put them in order, and staple them together. You may discuss these problems with your classmates, but you should work out the answers by yourself.

This homework will help us to evaluate your ability to apply the knowledge of computer architecture and system organization on real problem.

Problem 1 (15 points)
Do the Exercises 1.1 through 1.28 in Patterson and Hennessy’s textbook (see page 37).

Problem 2 (15 points)
Do the Exercises 1.29 through 1.45 in Patterson and Hennessy’s textbook (see page 39).

Problem 3 (15 points)
Do the Exercise 1.52 in Patterson and Hennessy’s textbook (see page 41).

Problem 4 (20 points)
Do the Exercise 1.54 in Patterson and Hennessy’s textbook (see page 41).

Problem 5 (10 points)
Do the Exercise 2.4 in Patterson and Hennessy’s textbook (see page 148).

Problem 6 (25 points)
Part A) Do the Exercise 2.6 in Patterson and Hennessy’s textbook (see page 148).

Part B) For the special case $j = 31$, you can reduce the number of instructions from part A to a single MIPS instruction. What is that instruction? If $j=31$ and $i=0$, what unsigned integer arithmetic operation does this example demonstrate? Use another MIPS instruction other than the first one you stated in Part B for the case $i = 5$ and $j=31$ to accomplish said operation.

Bonus:
Is the Pentium 4 architecture considered RISC or CISC? Justify your answer and please indicate your sources (using the internet on this question is appropriate).