EEL 6764 Principles of Computer Architecture
Homework #4

1   Problems

Total points: 100

1. Complete the following problems at the end of Chapter 3 of the textbook.

$$3.1, \quad 3.2, \quad 3.5, \quad 3.6(b, c), \quad 3.11$$

   Note: for problem **3.5**, assume the same pipeline design considered in 3.1 and 3.2.

2. [10+10 pts]   The following series of branch outcomes occurs for a single branch in a program. (T means the branch is taken, N means the branch is not taken).

Index	1	2	3	4	5	6	7	8	9	10	11	12	13
	T,	T,	N,	T,	N,	T,	T,	T,	T,	N,	T,	T,	N

   (a) Assume that we are trying to predict this sequence with a Branch History Table (BHT) using a 1-bit prediction. The counters of the BHT are initialized to the N state. Which of the branches would be mispredicted? Show their indices.

   (b) Repeat the above exercise with a 2-bit predictor as shown in Figure C.15 initialized to 10.

2   Requirement

- All homeworks should be done and submitted individually.

- Show all steps to get full points.

- Writing and drawings if necessary must clear and readable. Otherwise, substantial loss of points may occur.

- You must submit your solutions electronically via Canvas.

- The file for your solutions must be in PDF or MS-Word DOCX format.