

CpE 313 - HW 11 -- Question 1

actual direction	T	T	T	N	T	T	T	N	T	T	T	N	T
state	1	x											
predicted direction	T	y											
state	11	z											
predicted direction	T	w											

1) Please fill the entire table. Rows 2 and 3 pertain to 1-bit saturating counter. Rows 4 and 5 pertain to 2-bit saturating counter. Rules for the next state are given in the state diagrams given in the branch prediction lecture. For example, for 1-bit counter, if current state = 1 and actual direction is T, then counter's next state is 1, i.e., $x = 1$. Since $x = 1$, prediction is "taken" i.e., $y = T$.

For example, for 2-bit counter, if current state = 11 and actual direction is T, then counter's next state is 11, i.e., $z = 11$. Since $MSB(z) = 1$, prediction is "taken" i.e., $w = T$.

2) What is the mis-prediction rate for 1-bit counter?

3) What is the mis-prediction rate for 2-bit counter?

HW 11 -- Question 2

actual direction	T	N	T	N	T	N	T	N	T	N	T	N	T
state	1												
predicted direction	T												
state	11												
predicted direction	T												

1) Please fill the entire table. Same rules as the last question apply.

2) What is the mis-prediction rate for 1-bit counter?

3) What is the mis-prediction rate for 2-bit counter?