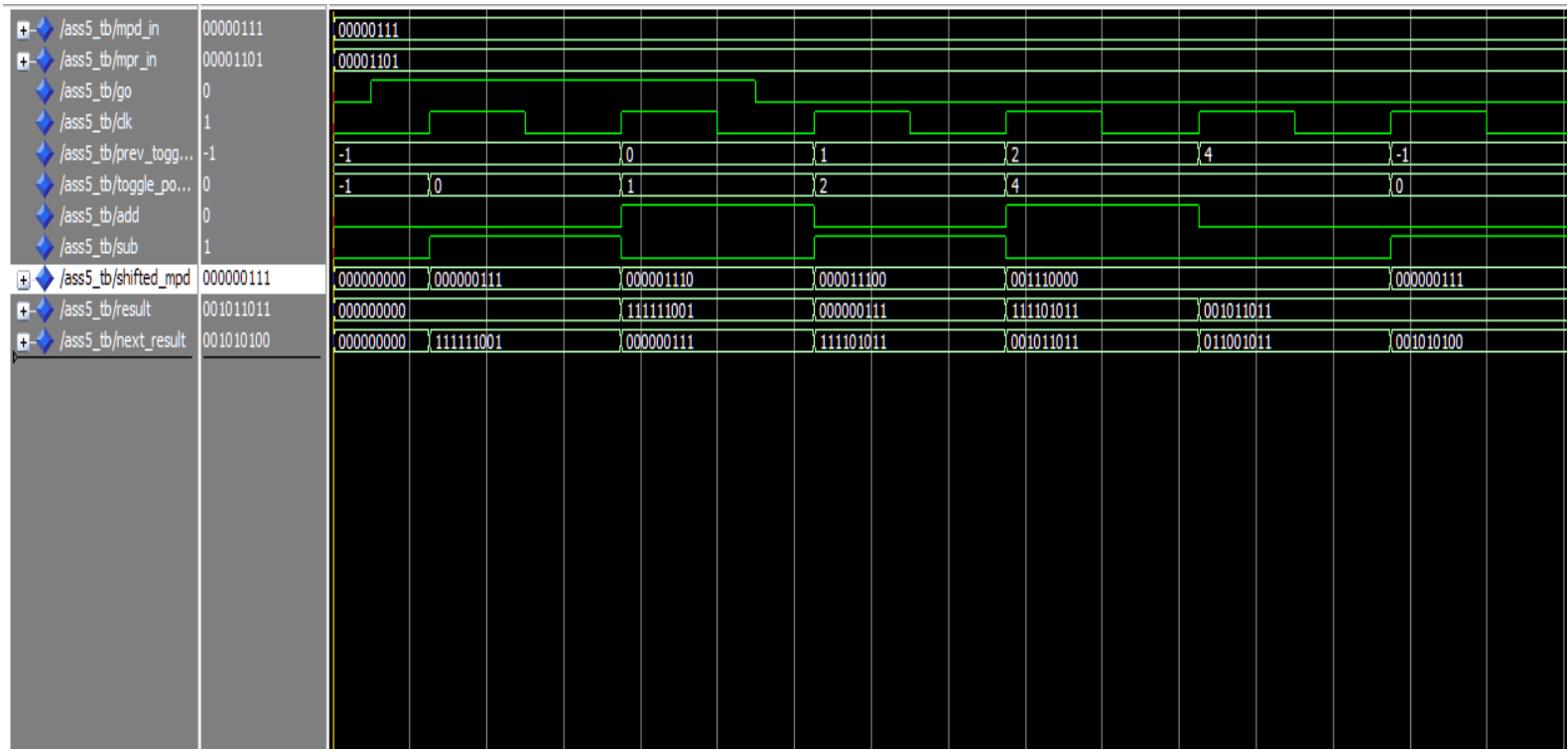
EE721 Programming Assignment 5

Booth Multiplier

The RTL simulation of the 4 bit Booth multiplier is shown below:



Mpd_in is the multiplicand and mpr_in is the multiplier. We have to check the toggling position of mpr_in (when it changes the bit from 0 to 1 or 1 to 0) considering starting position -1 which value is considered to be 0, starting from these value to 5^{th} bit checking the toggling position, when it toggles from 0 to 1 then subtract signal should be high and when it toggles from 1 to 0 signal add should be high. Next_result is generated as result +/- 2^toggle_location*mpd_in where initial result is initialized as 0 and and result is get the value of next_result after clock rising edge.

As shown in the simulation
For mpr_in = 00001101 toggle location should be at 0,1,2,4 and the simulation it shown exactly the same and the result after each clock cycle should be

Clock cycle	Result 9 bit	add	sub	Next_result
1	0(000000000)	0	1	0-7*2^0 = -7
2	-7(111111001)	1	0	-7+7*2^1 = 7
3	7(000000111)	0	1	7-7*2^2 = -21
4	-21(111101011)	1	0	-21+7*2^4=91
5	91(001011011)	0	0	91

This same result is showing the above waveform and 7*13 is also 91 which is verified.