Homework-1

ANUBHAV BHATLA
200070008

(B)

M attains two values : 0 and 1

(i) $M = 0$: The output of the first XOR gate is B_0
Thus the output of the first Full Adder, S_0 is $A_0 + B_0$
Similarly for the other 3 Full Adders.
Thus we get the final output $A+B$.
∴ The circuit behaves as a 4 bit Adder.

(ii) $M = 1$: The output of the first XOR gate is B_0' (complement of B_0). Thus the output of the first Full Adder is $A_0 + B_0' + M = A_0 + B_0' + 1$. This is equal to $A_0 - B_0$. Similarly for the other 3 Full Adders.
Thus we get the final output $A-B$.
∴ The circuit behaves as a 4 bit Subtractor.