Shift & Add Multiplication Table

Considering an 8-bit shift-and-add unsigned multiplier, as discussed in class.

Let X = 73_{10}. What is X in 8-bit binary? _____ Let Y = 15_{10}. What is Y in 8-bit binary? _____

What is X*Y in decimal? _____ What is the product in binary? _____

Show the **binary** values of the C, A, and Q registers after each ADD and SHIFT below. Do this by hand.

Step	C	A	Q	Desc
0				Initialization (C=0; A=0; Q=X)
1 – add				If Q_0 == 1. then A=A+M, else A=A+0
1 – shift				Shift Q; Q_3=A_0; Shift A; A_3=C
2 – add				If Q_0 == 1. then A=A+M, else A=A+0
2 – shift				Shift Q; Q_3=A_0; Shift A; A_3=C
3 – add				If Q_0 == 1. then A=A+M, else A=A+0
3 – shift				Shift Q; Q_3=A_0; Shift A; A_3=C
4 – add				If Q_0 == 1. then A=A+M, else A=A+0
4 – shift				Shift Q; Q_3=A_0; Shift A; A_3=C
5 – add				If Q_0 == 1. then A=A+M, else A=A+0
5 – shift				Shift Q; Q_3=A_0; Shift A; A_3=C
6 – add				If Q_0 == 1. then A=A+M, else A=A+0
6 – shift				Shift Q; Q_3=A_0; Shift A; A_3=C
7 – add				If Q_0 == 1. then A=A+M, else A=A+0
7 – shift				Shift Q; Q_3=A_0; Shift A; A_3=C
8 – add				If Q_0 == 1. then A=A+M, else A=A+0
8 – shift				Shift Q; Q_3=A_0; Shift A; A_3=C

Breakpoints Table (breakpoint at DEC DH)

DH	AH	AL	CH	Desc
08				Initialization
08				End of step 1
07				End of step 2
06				End of step 3
05				End of step 4
04				End of step 5
03				End of step 6
02				End of step 7
01				End of step 8