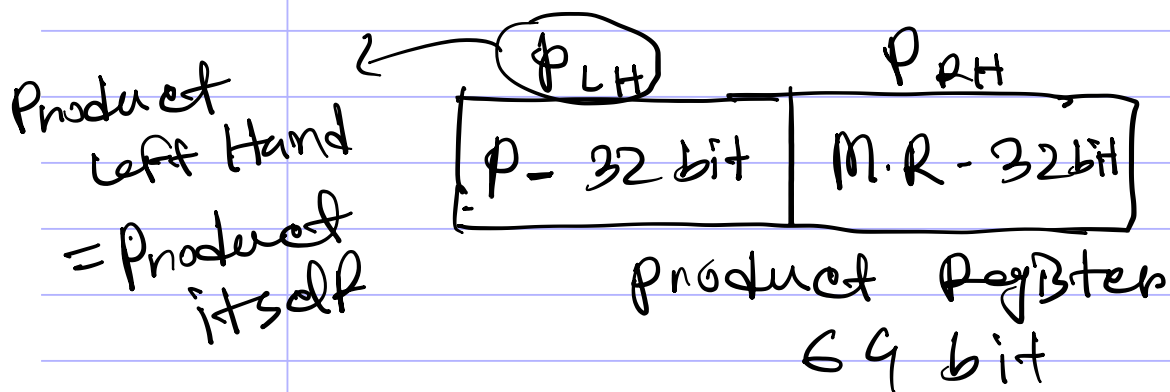


Lecture - 10

Optimized Multiplication

⊗ Long Multiplication এর সমস্যা হচ্ছে এটিতে যখন দু'দু' Register এর প্রয়োগ হয়।

→ So Optimized MUL. এর ক্ষেত্রে Register এর size কমায়।

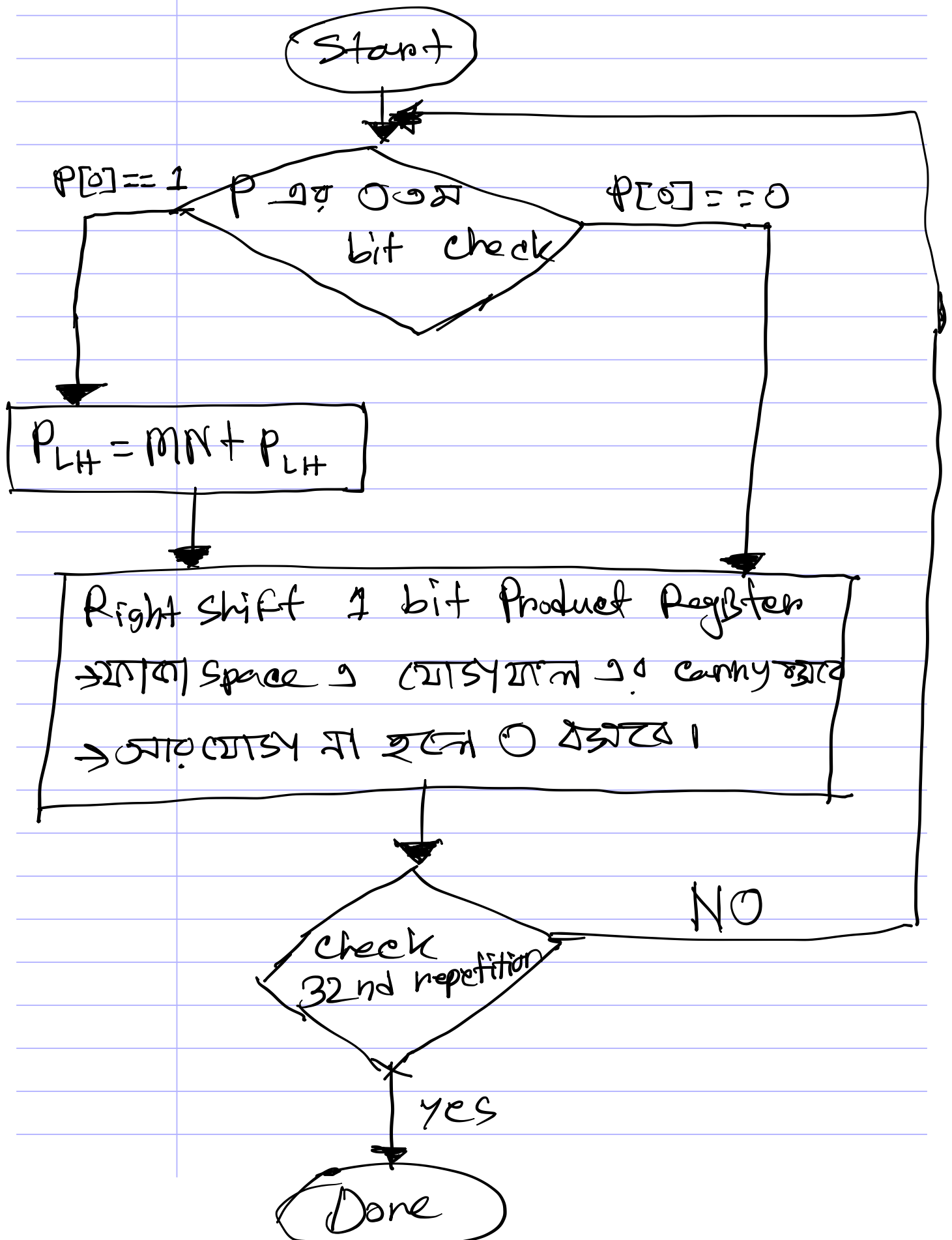


equation:

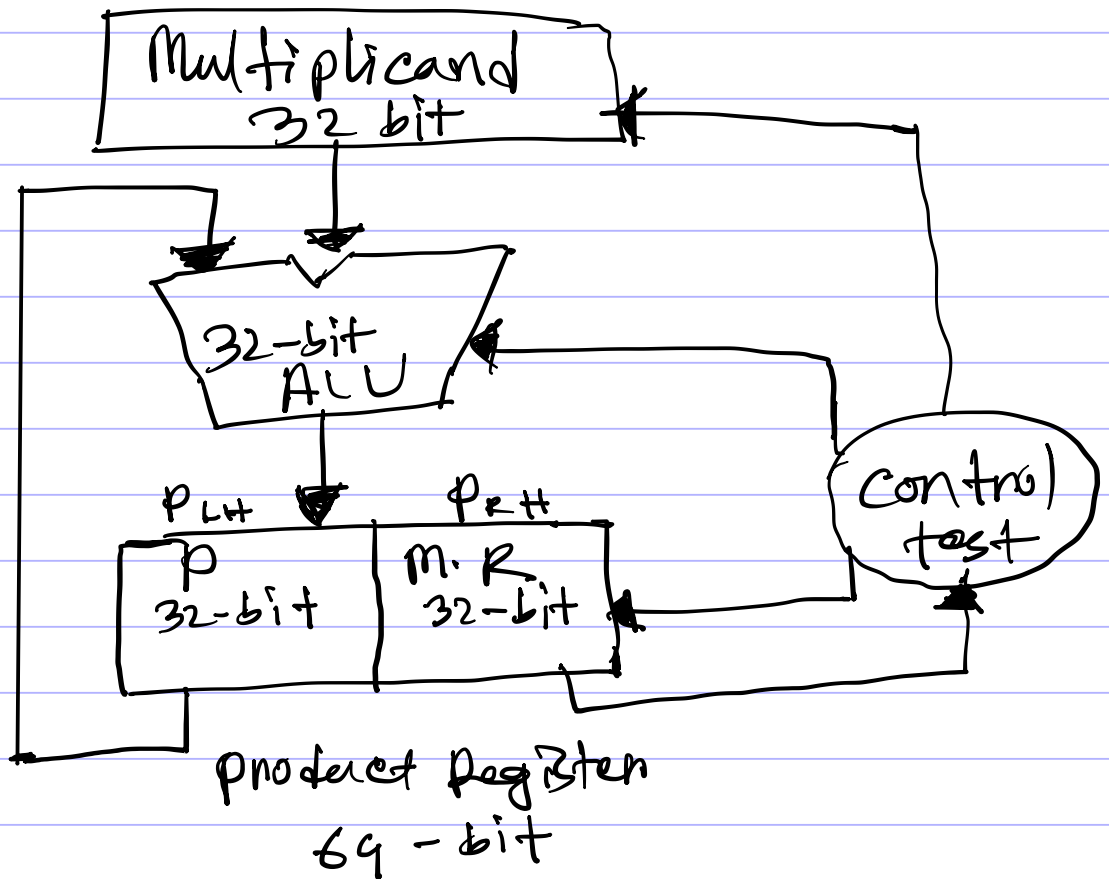
$$P_{LH} = M.N + P_{LH}$$

P - Left Hand Multiplication

Algorithm



Hardware



⊗ Example: Using Optimized Multiplication
Multiply x by y , where $x = 6$
and $y = 7$.

Ans:

$$MN \Rightarrow x = 6 = 0110$$

$$MR \Rightarrow y = 7 = 0111$$

$$p + mR = 0000 \ 0000$$

$$\begin{array}{r} 0111 \\ p = 0000 \ 0111 \end{array}$$

Initially:

$$p = 0000 \ 011\underline{1}$$

$$mN = 0110$$

Step 1: $p[0] == 1$

$$p_{LH} = mN + p_{LH}$$

$$= 0000 + 0110$$

$$= \boxed{0}0110$$

Carry

$$\therefore p = \underline{0110} \ \underline{0111}$$

$$\rightarrow p = \overset{1}{\cancel{0}}011 \ 00\underline{11}$$

$$mN = 0110$$

$$\boxed{0}1001 \ 0011$$

Step 2: $p[0] == 1$

$$p = 1001 \ 0011$$

$$\rightarrow p = \overset{1}{\cancel{0}}100 \ 100\underline{1}$$

$$mN = 0110$$

0 1 0 1 0 1 0 0 1

Step 3: $p[0] == 1$

$p: 1 0 1 0 1 0 0 1$

$\rightarrow p: \underline{0} 1 0 1 0 1 \underline{0 0}$

MN: 0 1 1 0

Step 9: $p[0] == 0$

$\rightarrow p: \underline{0} 0 1 0 1 0 1 0$

(62-decimal)

Ans