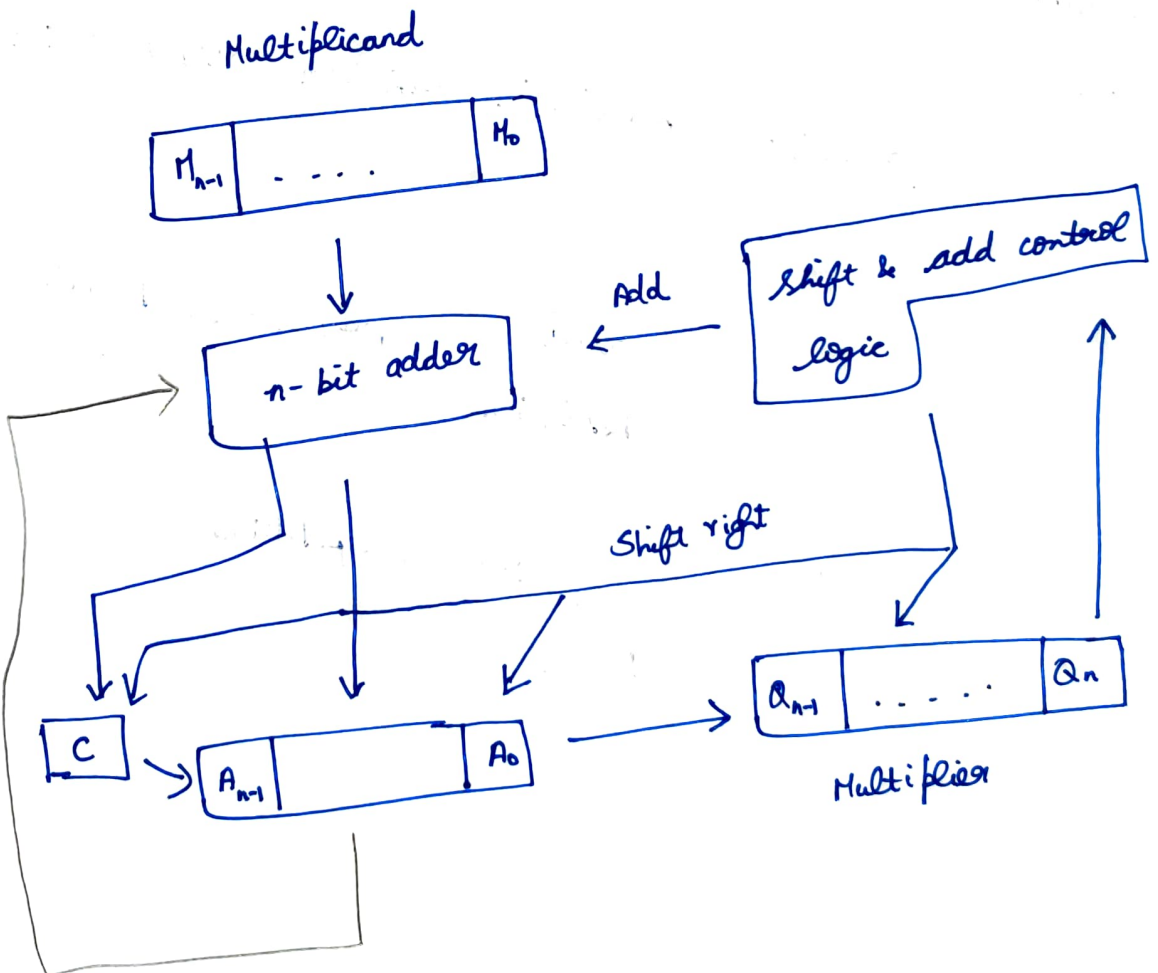


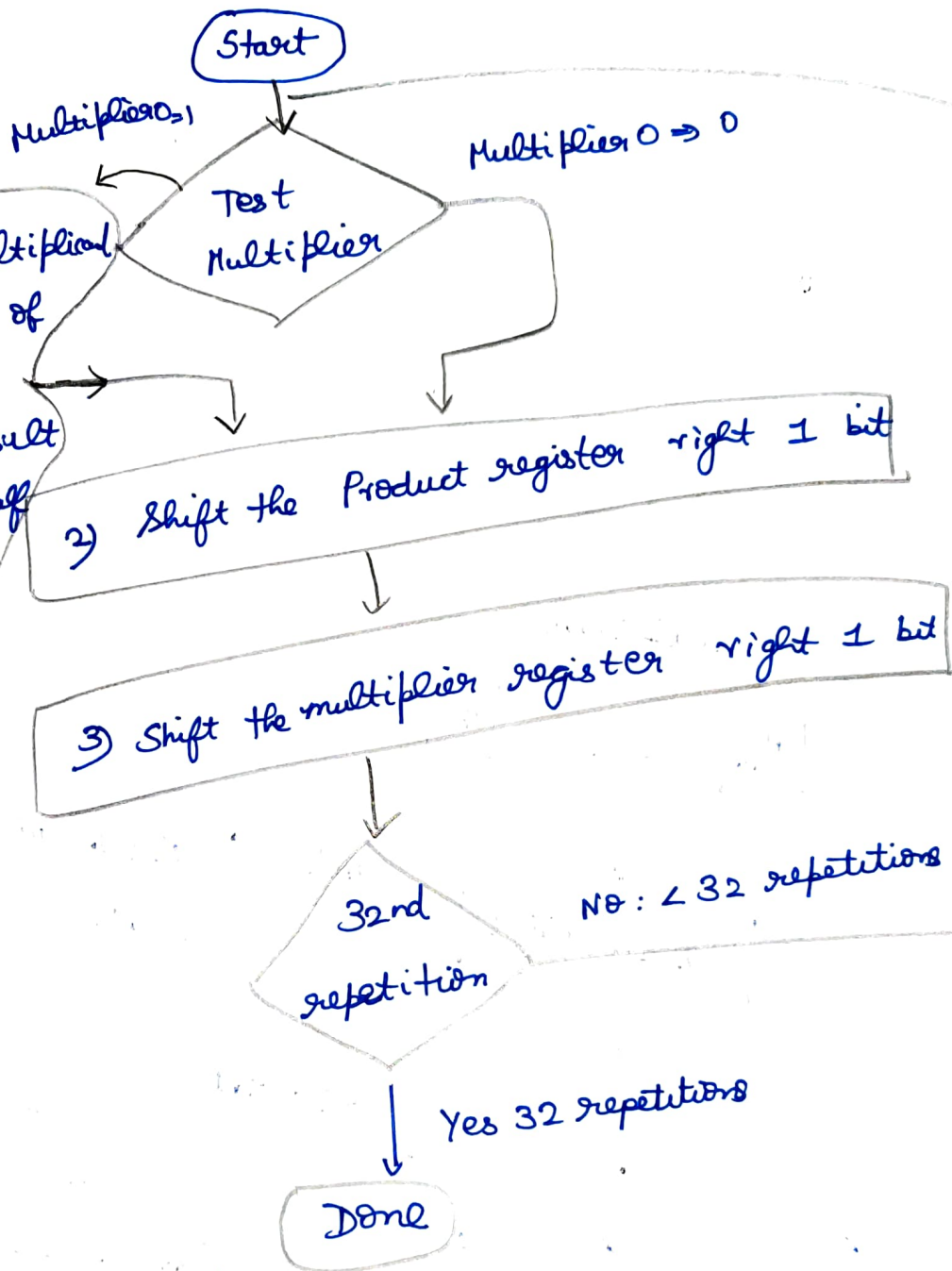
CSI1004 Computer Organization  
and Architecture

Name : Prashanth - S

Roll : 19MID0020

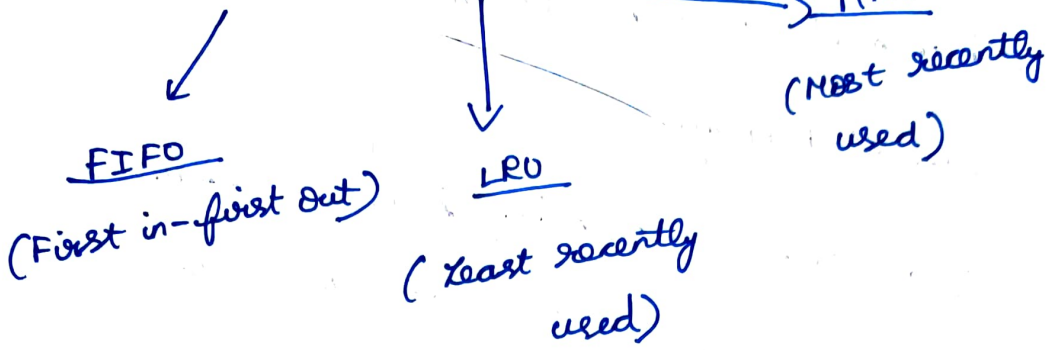
3) Design a hardware & algorithm  
for multiplying 32 bit  $\times$  32 bit



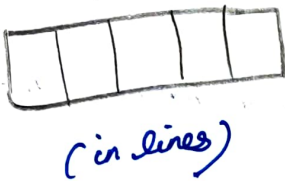


2)

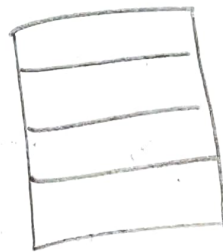
Cache replacement algorithm.



Cache Memory



Main Memory



a)

FIFO:

Replace that block in the set that has been in the cache longest

b)

LRU:

Replace the blocks in the set that has been in the cache longest item with no reference to it.

c)

LFU:

Replace the blocks in the set that has experienced the fewest references.

Any other mechanism cannot be adopted

Always Mapping has some disadvantages.

So replacement algorithms are more efficient than Mapping.

Draw backs of Mapping:

- \* There is a high conflict miss, it is to replace a cache memory block even other blocks in the cache memory were present as empty.
- \* Large tag comparison can be made in case of associative mapping.
- \* To avoid the conflict, any block of main memory can be placed anywhere in the cache memory.

But these conflicts are not observed in page replacement algorithm.

Since RAM is divided into pages and cache divided into frames, Replacement algorithms are more efficient.

# Booth Multiplication for 3 numbers

BR  $\Rightarrow$  Multiplicand  
QR  $\Rightarrow$  Multiplier

AC  $\rightarrow 0$   
 $Q_{n+1} \rightarrow 0$   
 $SC \leftarrow n$

Ans  $\Rightarrow$  Convert to decimal and then to binary and store to AC  
 $AC \leftarrow Ans$   
 $Q \leftarrow 3^{rd} \text{ number (AR)}$   
 $Q_{n+1} \leftarrow 0$   
 $SC \leftarrow n$

10  $\rightarrow Q_n \quad Q_{n+1}$   
 $AC \leftarrow AC + \overline{BR} + 1$

01  
 $AC \leftarrow AC + BR$

00  
11  
 $\downarrow \downarrow$   
Shift right (AC & QR)  
 $SC \leftarrow SC - 1$

SC  $\rightarrow$  0  
No  
Any 3<sup>rd</sup> number

Ans  $\Rightarrow AC, Q_n$   
AR  $\Rightarrow 3^{rd} \text{ number}$

Ans  $\Rightarrow AC, Q_n$