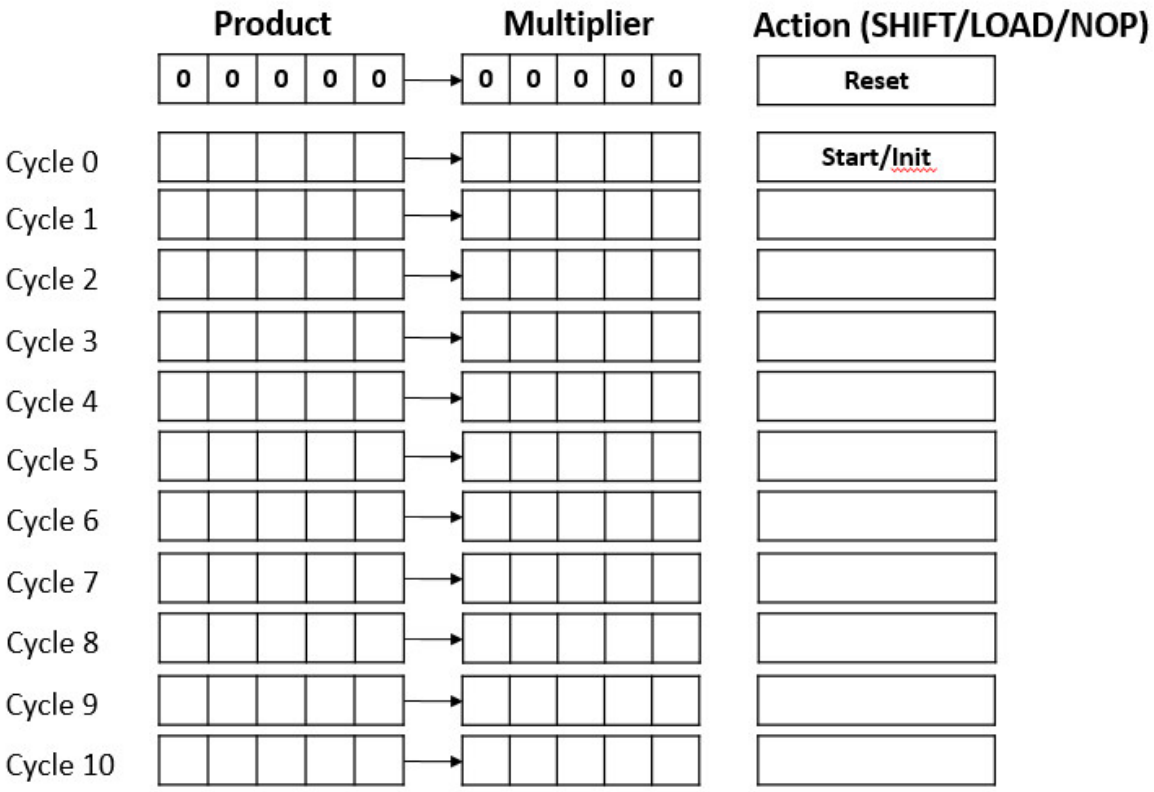
CPEG 422/622 Spring 2020

Homework 4

Due April 3rd at midnight (through Canvas)

1. Suppose there is a 5-bit Booth's multiplier, the multiplicand is **01011** and multiplier is **11010**, all in two's complement form. Please fill in the snapshot value of *partial product* register and *multiplier* register at each cycle, as well as the corresponding operation in the cycle.



2. For the following examples of signals and variables, report the value of RESULT when the TRIGGER signal changes. Each table shows the waveform of TRIGGER. Fill in each table with the value of RESULT. Briefly explain your answer.

A process using variables

```
architecture VAR of EXAMPLE is
        signal TRIGGER, RESULT: integer := 0;
begin
        process
                variable var1: integer :=1;
                variable var2: integer :=2;
                variable var3: integer :=3;
        begin
                wait on TRIGGER;
                var1 := var2;
                var2 := var1 + var3;
                var3 := var2;
                RESULT <= var1 + var2 + var3;
        end process;
end VAR
```

A process using signals

```
architecture SIGN of EXAMPLE is
signal TRIGGER, RESULT: integer := 0;
signal sig1: integer :=1;
signal sig2: integer :=2;
signal sig3: integer :=3;
begin
process
begin
wait on TRIGGER;
sig1 <= sig2;
sig2 <= sig1 + sig3;
sig3 <= sig2;
RESULT <= sig1 + sig2 + sig3;
end process;
end SIGN;
```

The variable case:

	0 ns	5 ns	10 ns	15 ns	20 ns	25 ns	30 ns	35 ns
TRIGGER	1	0	1	0	1	0	1	0
RESULT								

The signal case:

	0 ns	5 ns	10 ns	15 ns	20 ns	25 ns	30 ns	35 ns
TRIGGER	1	0	1	0	1	0	1	0