Gebze Technical University
Computer Engineering

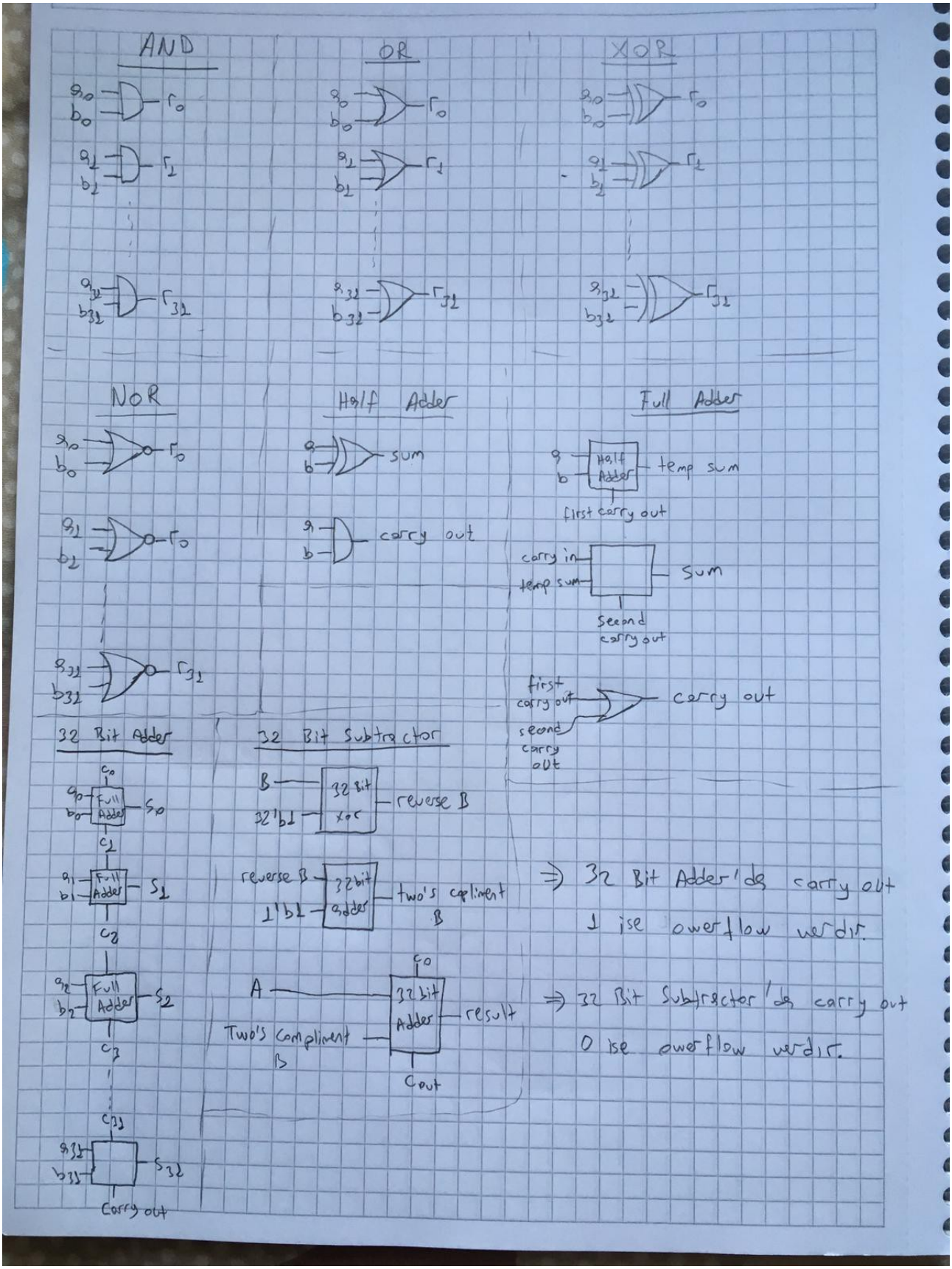
CSE 331 - 2018 Fall

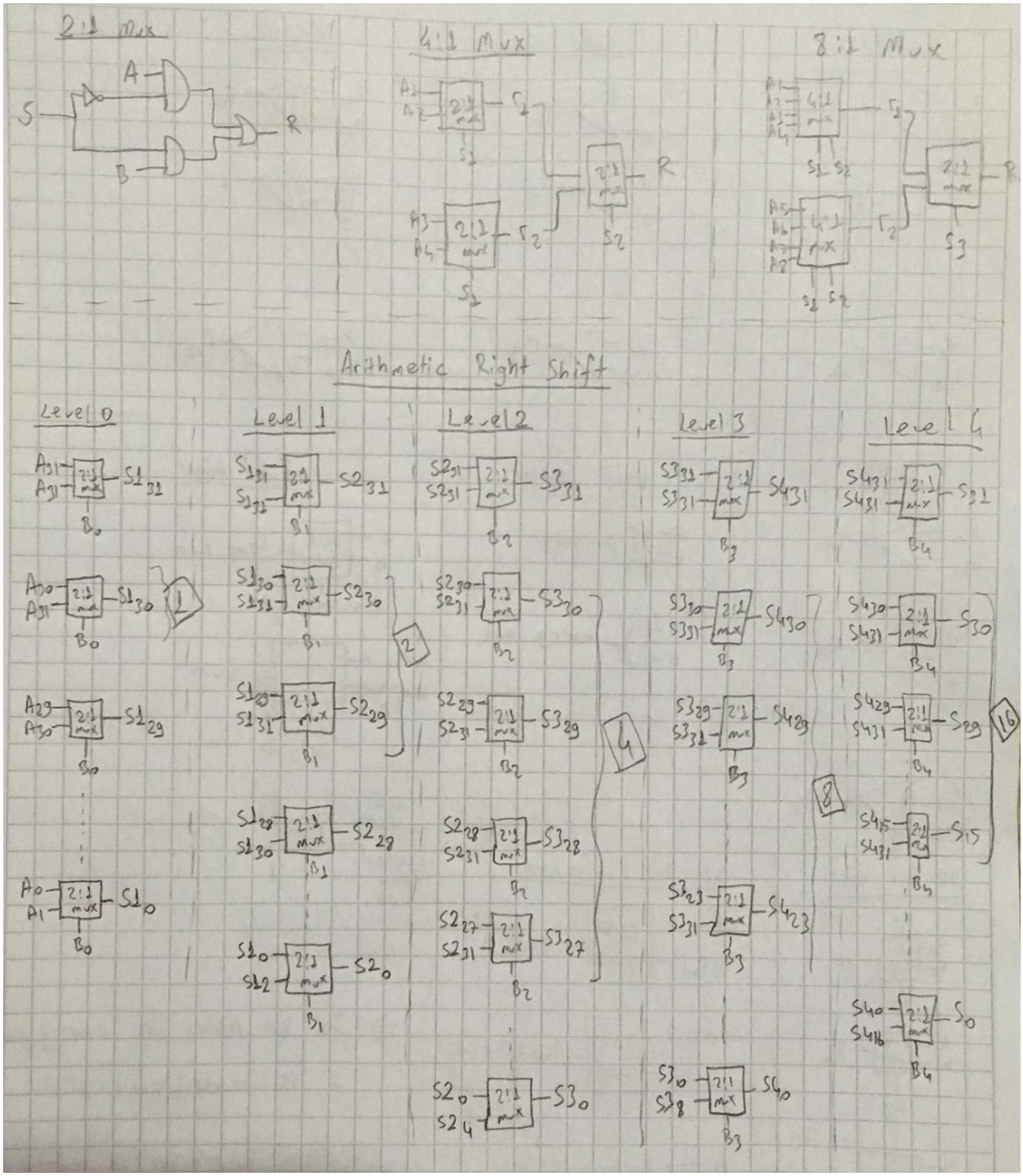
HOMEWORK 2 REPORT

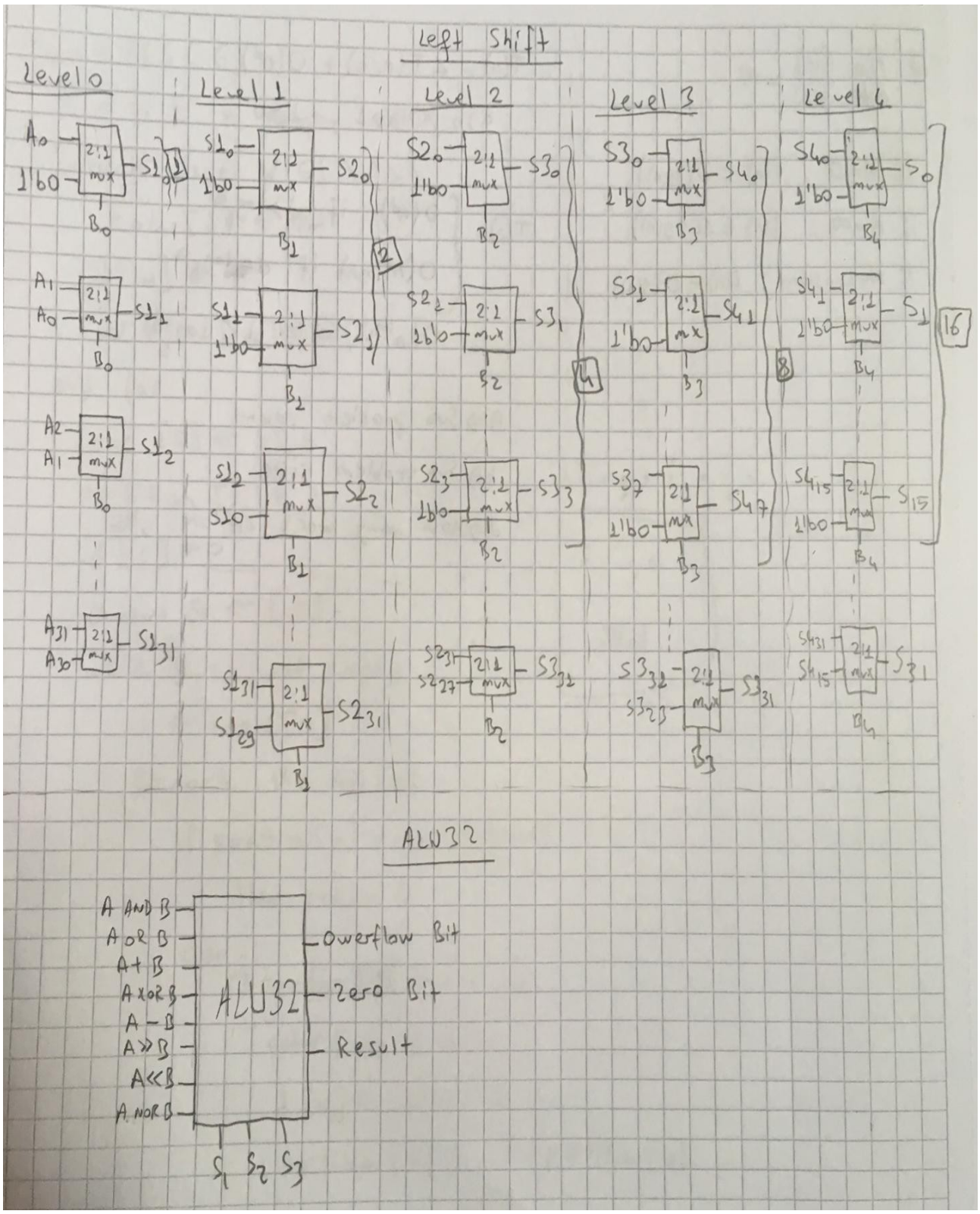
EMİRHAN KARAGÖZOĞLU
151044052

Course Assistant: Fatma Nur Esirci

Schematic Desings for all Modules




2:1 mux
A
S
R
B
4:1 MUX
8:1 MUX
Arithmetic Right Shift
Level 0
Level 1
Level 2
Level 3
Level 4
1
2
4
8
16


Left Shift
Level 0
Level 1
Level 2
Level 3
Level 4
2:1 mux
ALU32
A AND B
A or B
A + B
A xor B
A - B
A >> B
A << B
A NOR B
Overflow Bit
Zero Bit
Result

Verilog Modules and Their Description

AND : 32 bit 2 adet sayı alır AND işlemi yapar ve 32 bit sonuç return eder.
OR : 32 bit 2 adet sayı alır OR işlemi yapar ve 32 bit sonuç return eder.
NOR : 32 bit 2 adet sayı alır NOR işlemi yapar ve 32 bit sonuç return eder.
XOR : 32 bit 2 adet sayı alır XOR işlemi yapar ve 32 bit sonuç return eder.
+ operator : 32 bit 2 adet sayı alır toplama işlemi yapar ve 32 bit sonuç return eder.
- operator : 32 bit 2 adet sayı alır çıkarma işlemi yapar ve 32 bit sonuç return eder.
>> operator : 32 bit 2 adet sayı alır ilk sayıyı ikinci sayı kadar aritmetik olarak sağa kaydırır.
<< operator : 32 bit 2 adet sayı alır ilk sayıyı ikinci sayı kadar sola kaydırır.
Alu32: 32 bit 2 sayı ve 3 bit seçici alır, seçiciye göre gerekli işlemin sonucunu ,**overflow bitini ve zero bitini** döndürür.

Modelsim Simulation Results

```
VSIM 5> step -current
# time =  0, Operation: 000, A =01010111000000000101000000000101110, B=00101010100011100101000101100011, R=00000010000000000000000000000100010 Owerflow=0, ZeroBit=0
# time = 20, Operation: 000, A =10101010101010101010101010101010, B=01010101010101010101010101010101, R=00000000000000000000000000000000 Owerflow=0, ZeroBit=1
# time = 40, Operation: 000, A =11110111000001101000010100100001, B=10110001001000110101000101111010, R=10110001000000010000000001001000000 Owerflow=0, ZeroBit=0
# time = 60, Operation: 001, A =01010111000000000101000000000101110, B=00101010100011100101000101100011, R=01111111100011101111100010110111111 Owerflow=0, ZeroBit=0
# time = 80, Operation: 001, A =11010111001001001010000000001010, B=10100110010001000010000101101001, R=11110111011001001010000101101011 Owerflow=0, ZeroBit=0
# time = 100, Operation: 001, A =11110111000001101000010100100001, B=10110001001000110101000101111010, R=11110111001001111101010101111011 Owerflow=0, ZeroBit=0
# time = 120, Operation: 010, A =01000000000000000000000000000000, B=01000000000000000000000000000000, R=10000000000000000000000000000000 Owerflow=1, ZeroBit=0
# time = 140, Operation: 010, A =11010111001001001010000000001010, B=10100110010001000010000101101001, R=01111101011010001100000101110011 Owerflow=1, ZeroBit=0
# time = 160, Operation: 010, A =11110111000001101000010100100001, B=10110001001000110101000101111010, R=10101000001010011101011010011011 Owerflow=0, ZeroBit=0
# time = 180, Operation: 011, A =01010111000000000101000000000101110, B=00101010100011100101000101100011, R=01111101100011101111000101001101 Owerflow=0, ZeroBit=0
# time = 200, Operation: 011, A =11010111001001001010000000001010, B=10100110010001000010000101101001, R=01110001011000001000000101100011 Owerflow=0, ZeroBit=0
# time = 220, Operation: 011, A =11110111000001101000010100100001, B=10110001001000110101000101111010, R=01000110001001011101010001011011 Owerflow=0, ZeroBit=0
# time = 240, Operation: 100, A =11010111001001001010000000001010, B=10100110010001000010000101101001, R=00110000111000000111111010100001 Owerflow=1, ZeroBit=0
# time = 260, Operation: 100, A =00000000000000000000000000100000, B=00000000000000000000000000000010, R=00000000000000000000000000011110 Owerflow=0, ZeroBit=0
# time = 280, Operation: 100, A =00000000100100000000000001110000, B=00000000000000001000000000000000, R=00000000100011111000000001110000 Owerflow=0, ZeroBit=0
# time = 300, Operation: 101, A =01010111000000000101000000000101110, B=00000000000000000000000000000001, R=00101011100000000101000000010111 Owerflow=0, ZeroBit=0
# time = 320, Operation: 101, A =11010111001001001010000000001010, B=00000000000000000000000000000011, R=11111010111001001001010000000001 Owerflow=0, ZeroBit=0
# time = 340, Operation: 101, A =11110111000001101000010100100001, B=00000000000000000000000000001011, R=11111111111111110111000001101000 Owerflow=0, ZeroBit=0
# time = 360, Operation: 110, A =01010111000000000101000000000101110, B=00000000000000000000000000000001, R=10101110000000010100000000101110 Owerflow=0, ZeroBit=0
# time = 380, Operation: 110, A =11010111001001001010000000001010, B=00000000000000000000000000000011, R=10111001001001010000000001010000 Owerflow=0, ZeroBit=0
# time = 400, Operation: 110, A =11110111000001101000010100100001, B=00000000000000000000000000001011, R=00110100001010010000100000000000 Owerflow=0, ZeroBit=0
# time = 420, Operation: 111, A =01010111000000000101000000000101110, B=00101010100011100101000101100011, R=10000000011100010000111010010000 Owerflow=0, ZeroBit=0
# time = 440, Operation: 111, A =11010111001001001010000000001010, B=10100110010001000010000101101001, R=00001000100110110101111010010100 Owerflow=0, ZeroBit=0
# time = 460, Operation: 111, A =11110111000001101000010100100001, B=10110001001000110101000101111010, R=00001000110110000001010101000100 Owerflow=0, ZeroBit=0

VSIM 6>
```