**UE18EC256: Embedded System Design Laboratory**

**Using Keil IDE (Assembly Level Programs)**

**CYCLE 1**

1. Write an ALP to find the GCD (Greatest Common Divisor) with conditional execution of ARM instructions.

AREA GCD, CODE, READONLY

ENTRY

MOV R0, #25

MOV R1, #5

BACK CMP R0, R1

BEQ label

BLT lessd

SUB R0, R0, R1

B BACK

lessd SUB R1, R1, R0

B BACK

Label B Label

END

Output: GCD of two numbers is 5

2. Write an ALP to copy the given string from Source to Destination

AREA strcpy, CODE, READWRITE

adr r0,source

adr r1,destination

mov r2,#8

loop1 ldrb r3,[r0],#1

strb r3,[r1],#1

subs r2,r2,#1

bne loop1

source dcb 'p','a','v','i','t','h','r','a';

destination dcb '0','0','0','0','0','0','0','0'

end

output Destination will be having the string as of source

3.Write an ALP to find the product of two matrices using with and without MLA ARM instruction.

AREA MAT3MUL, CODE, READWRITE ; name this block of code

ADR R1,ARRY1

ADR R3, RESULT

MOV R0, #3 ; ROW COUNTER

BACK ADR R2,ARRY2

MOV R4, #3 ;COLUMN COUNTER

NEXT MOV R6,#0

MOV R5,#3 ; DOT MULTIPLICATION COUNTER

X LDR R7, [R1], #4

LDR R8, [R2], #12

MLA R6, R7, R8, R6

SUBS R5, R5, #1

BNE X

STR R6, [R3], #4

SUBS R4, R4, #1

SUB R2, R2, #0X20

SUBNE R1, R1, #12

BNE NEXT

SUBS R0,R0,#1

BNE BACK

HERE B HERE

ARRY1 DCD 1,2,3

DCD 4,5,6

DCD 7,8,9

ARRY2 DCD 1,2,3

DCD 1,2,3

DCD 1,2,3

RESULT SPACE 50

END

Output:

6 0c 12

0f 1e 2d

18 30 48

4.Write an ALP to find the convolution of two sequences using with and without MLA ARM instruction

AREA CONVOLUTION, CODE, READwrite ; name this block of code

ADR R0,SEQ1

ADR R5, RES

MOV R10, #4

MOV R9,#1

; FIRST HALF

BACK MOV R2,#0

ADR R1, SEQ2

MOV R11,R9

BL PROD

STR R2, [R5],#4

ADD R9, R9, #1

MOV R12, R9, LSL #2

ADD R0, R0, R12

SUBS R10,R10, #1

BNE BACK

; SECOND HALF

MOV R10,#3

MOV R12, #4

BACK1 ADR R1, SEQ2

ADR R0, SEQ1+12

MOV R2, #0

ADD R1, R1, R12

MOV R11, R10

BL PROD

STR R2, [R5], #4

ADD R12, R12, #4

SUBS R10, R10, #1

BNE BACK1

EXIT B EXIT

; DOT PRODUCT

PROD LDR R3,[R0],#-4

LDR R4,[R1],#4

MLA R2,R3,R4,R2

SUBS R11,R11,#1

BNE PROD

MOV PC, LR

SEQ1 DCD 1,2,3,4

SEQ2 DCD 5,6,7,8

RES SPACE 100

END

Output: 5,10,28,3c,3d,34,20