**Microprocessor and Computer Architecture (MPCA) Laboratory  
UE20CS252 4th Semester,  
Academic Year 2021-22**

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**Week 2 : 04 Feb 2021**

**1) Title of Program:**

Write a program in ARM7TDMI-ISA to find GCD of two numbers.

a. Assume operands to be in the CPU registers  
b. Assume operands in the memory locations.

**Program Code:**

**1)A)**

.TEXT  
MOV R0,#6  
MOV R1,#4  
GCD: CMP R0,R1 BEQ RES

BLT LOOP  
SUB R0,R0,R1  
B GCD  
LOOP: SUB R1,R1,R0 B GCD  
RES: MOV R2,R0 SWI 0X011  
.END

**Screenshot of ARMSimulator:**

**Graphical user interface, application

Description automatically generated**

**1)B)**

.DATA  
A: .WORD 6

B: .WORD 4

.TEXT

LDR R3,=A  
LDR R4,=B  
LDR R0,[R3]  
LDR R1,[R4]

GCD: CMP R0,R1

BEQ RES

BLT LOOP  
SUB R0,R0,R1  
B GCD  
LOOP: SUB R1,R1,R0

B GCD  
RES: MOV R2,R0

SWI 0X011

.END

**Screenshot of ARMSimulator:**

Graphical user interface, text, application

Description automatically generated

**2) Title of Program:**

Write a program in ARM7TDMI-ISA to find the sum of N data items in the memory. Store the result in the memory location.

a. Use Pre-indexing addressing mode

b. Use Post- Indexing addressing mode

c. Use Auto-indexing addressing mode

**Program Code:**

**2)A)**

.DATA  
A: .WORD 10,20,30,40 SUM: .WORD 0  
.TEXT  
MOV R2,#0  
LDR R1,=A  
LDR R3,=SUM  
MOV R6,#0  
SUB R1,R1,#4

LOOP:  
LDR R4,[R1,#4]

ADD R1,R1,#4

ADD R2,R2,R4

ADD R6,R6,#1

CMP R6,#4

BNE LOOP

STR R2,[R3]

.END

**Screenshot of ARMSimulator:**

Graphical user interface, text, application

Description automatically generated

**2)B)**

.DATA  
A: .WORD 10,20,30,40

SUM: .WORD 0  
.TEXT  
MOV R2,#0  
LDR R1,=A  
LDR R3,=SUM  
MOV R6,#0

LOOP:  
LDR R4,[R1,#4]

ADD R2,R2,R4

ADD R6,R6,#1

CMP R6,#4

BNE LOOP

STR R2,[R3]

.END

**Screenshot of ARMSimulator:**Graphical user interface, text, application

Description automatically generated

**2)C)**

.DATA  
A: .WORD 10,20,30,40 SUM: .WORD 0  
.TEXT  
MOV R2,#0  
LDR R1,=A  
LDR R3,=SUM  
MOV R6,#0

SUB R1,R1,#4

LOOP:  
LDR R4,[R1,#4]!

ADD R2,R2,R4

ADD R6,R6,#1

CMP R6,#4

BNE LOOP

STR R2,[R3]

.END

**Screenshot of ARMSimulator:**

Graphical user interface, text, application, email

Description automatically generated

**3) Title of Program:**

Write a program in ARM7TDMI-ISA to find the sum of N data items at alternate [ odd or **even** positions] locations in the memory. Store the result in the memory location.

a. Use Pre-indexing addressing mode

b. Use Post- Indexing addressing mode

c. Use Auto-indexing addressing mode

**Program Code:**

**3)A)**

.DATA

A: .WORD 10,20,30,40

SUM: .WORD 0

.TEXT

MOV R2,#0

LDR R1,=A

LDR R3,=SUM

MOV R6,#0

SUB R1,R1,#8

LOOP:

LDR R4,[R1,#8]

ADD R1,R1,#8

ADD R2,R2,R4

ADD R6,R6,#1

CMP R6,#2

BNE LOOP

STR R2,[R3]

.END

**Screenshot of ARMSimulator:**

Graphical user interface, text, application, email

Description automatically generated

**3)B)**

.DATA

A: .WORD 10,20,30,40

SUM: .WORD 0

.TEXT

MOV R2,#0

LDR R1,=A

LDR R3,=SUM

MOV R6,#0

LOOP:

LDR R4,[R1],#8

ADD R2,R2,R4

ADD R6,R6,#1

CMP R6,#2

BNE LOOP

STR R2,[R3]

.END

**Screenshot of ARMSimulator:**

Graphical user interface, text, application, email

Description automatically generated

**3)C)**

.DATA

A: .WORD 10,20,30,40

SUM: .WORD 0

.TEXT

MOV R2,#0

LDR R1,=A

LDR R3,=SUM

MOV R6,#0

SUB R1,R1,#8

LOOP:

LDR R4,[R1,#8]!

ADD R2,R2,R4

ADD R6,R6,#1

CMP R6,#2

BNE LOOP

STR R2,[R3]

.END

**Screenshot of ARMSimulator:**

Graphical user interface, text, application, email

Description automatically generated

**4) Title of Program:**

Write a program in ARM7TDMI-ISA to search for an element in an array. Store 00 if the search is unsuccessful and 01 if the search is successful in the register.

a. Use Linear Search Technique

**Program Code:**

.DATA

A: .WORD 10,20,30,40,50

KEY:.WORD 40

.TEXT

LDR R0,=A

LDR R1,=KEY

LDR R5,[R1]

MOV R4,#1

LOOP:

LDR R2,[R0],#4

CMP R5,R2

BEQ FOUND

ADD R4,R4,#1

CMP R4,#5

BNE LOOP

MOV R3,#0

B EXIT

FOUND: MOV R3,#1

EXIT:SWI 0X011

**Screenshot of ARMSimulator:**

Graphical user interface, text, application, email

Description automatically generated