Assembly Coding Exercise 1

Task: Get the average of 10 numbers stored in 0x20002000~0x20002024. MEMORY ADDRESS INCREMENTS BY 4.

;R10 contains the sum of 10 numbers.

;R9 contains the average.

;R0 contains a temporary address.

;R1 is a temporary counter.

;R8 contains the number of data (10).

;Each of 0x20002000~0x200020024 has a number stored.

1)

MOV R10, #0 ;CLEAR R10 REGISTER

LDR R0, =0X20002000 ;GET THE FIRST ADDRESS

ADD R10, R10, [R0] ;ADD THE FIRST DATA TO R10

LDR R0, =0X20002004 ;GET THE SECOND ADDRESS

ADD R10, R10, [R0] ;ADD THE SECOND DATA TO R10

LDR R0, =0X20002008 ;GET THE THIRD ADDRESS

ADD R0, R10, [R0] ;ADD THE THIRD DATA TO R10

LDR R0, =0X200020012

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LDR R0, =0X20002024 ;GET THE LAST ADDRESS

ADD R10, R10,[R0] ;ADD THE LAST DATA TO R10

UDIV R9, R10,R9 ;Unsigned division. R9=R10/R9

2)

MOV R10, #0 ;CLEAR R10 REGISTER

MOV R1, R8 ;MAKE R1 A COUNTER

LDR R0, =0X20002000 ;LOAD THE STARTING ADDRESS TO R0

LOOP ADD R10, R10,R[0]

ADD R0, R0, #4 ;INCREAMENT THE ADDRESS BY 4 IN R0

ADDS R1, R1, #-1 ;DECREMENT THE COUNTER

BNE LOOP ;REPEAT 10 TIMES. WHEN DONE, MOVE ON.

UDIV R9, R10, R8 ; Unsigned division. R9=R10/R9

Assembly Coding Exercise #2

Task: Read a datum from a keyboard and store it to the memory space at 0x20002000. Repeat the process 10 times in total while incrementing the memory address sequentially up to 0x20002024.

;A fictitious subroutine KEYBOARD reads a data from the keyboard then loads it at R0 register.

;R10 contains a number 10.

;R1 is a temporary register.

1) BL KEYBOARD ;READ THE KEYBOARD AND LOAD THE DATA TO R0.

LDR R1, =0X20002000 ;ASSIGN R1 THE FIRST ADDRESS TO STORE

STR RO, [R1] ;STORE THE DATA TO 0X20002000

BL KEYBOARD ;READ THE KEYBOARD AND LOAD THE DATA TO R0.

LDR R1, =OX20002004 ;ASSIGN R1 THE SECOND ADDRESS TO STORE

STR R0, [R1] ;STORE A DATA TO 0X20002001

BL KEYBOARD ;READ THE KEYBOARD AND LOAD THE DATA TO R0

LDR R1, =0X20002008 ;ASSING R1 THE THIRD ADDRESS TO STORE.

STR R0, [R1]

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BL KEYBOARD ;READ THE KEYBOARD AND LOAD THE DATA TO R0

LDR R1, =0X20002024 ;ASSIGN R1 THE LASS ADDRESS TO STORE

STR R0, [R1] ;STORE THE LAST DATA TO 0X2000200A

KEYBOARD

;HERE COMES A ROUTINE THAT READS A DATUM FROM A KEYBOARD

; AND LOADS IT at R0.

BX LR ;RETURN BACK TO THE MAIN PROGRAM

2) LDR R1, =0X20002000 ;ASSIGN THE INITIAL ADDRESS TO R1

LOOP ;THE LABEL FOR LOOPING

BL KEYBOARD ;READ A DATA FROM A KEYBOARD

STR R0,[R1] ;STORE THE DATA TO THE ADDRESS IN R1

ADD R1, R1,#4 ;INCREMENT THE ADDRESS IN R1 BY 4.

ADDS R10, R10,#-1 ;DECREMENT THE COUNTER IN R10

BNE LOOP ;REPEAT 10 TIMES. WHEN DONE, MOVE ON.

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KEYBOARD

;HERE COMES A ROUTINE THAT READ A DATUM FROM A KEYBOARD

; AND LOADS IT TO R0.

BX LR ;RETURN BACK TO THE MAIN PROGRAM