CPE301 – SPRING 2021

Design Assignment 1B

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Primary Github address: https://github.com/cpemejia/design\_assignments.git

Directory: design\_assignments

; DA\_1BB.asm

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; Created: 2/19/2021 9:14:33 PM

; Author : ElmerOMejia

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.EQU STARTADDS = 0x0400 ; mem address 0x400

.EQU ODDS = 0x500 ; mem address 0x500

.EQU EVENS = 0x600 ;mem address 0x600

.ORG 00 ; begin at memory 0

CLR R1 ; clear register R1

LDI R16, 0x70 ; load immediate decimal value 112 into R16

MOV R14, R16 ; move R16 into R14

LDI R16, 0x21 ; load immediate decimal value 33 into R16

MOV R15, R16 ; move R16 into R16

LDI XL, LOW(STARTADDS) ; x pointer to point to low address 0x00

LDI XH, HIGH(STARTADDS) ; x pointer to point to high address 0x04

LDI YL, LOW(ODDS) ; y pointer to point to low address 0x00

LDI YH, HIGH(ODDS) ; y pointer to point to high address 0x05

LDI ZL, LOW(EVENS) ; z pointer to point to low address 0x00

LDI ZH, HIGH(EVENS) ; z pointer to point to high address 0x06

L1:

ST X+, R15 ; store R15 where x is pointed to

MOV R17, R15 ; move R15 into R17

ADD R18, R17 ; running sum for total

ADC R19, R1 ; add carry to R19 if carry flag set

MOV R13, R15 ; move R15 into R13

ROR R13 ; rotate R13 right

BRCS odd ; after rotate, if last bit 1, then number is odd

JMP even ; else its even

even:

ST Z+, R15 ; if even store where Z is pointed to

MOV R23, R15 ; move R15 into R23

ADD R24, R23 ; running sum for even

ADC R25, R1 ; add carry to R25 if carry flag set

INC R15 ; increment R15

JMP count\_dec ; jump to decrement counter

odd:

ST Y+, R15 ; if odd store where Z is pointed to

MOV R20, R15 ; move R15 into R20

ADD R21, R20 ; running sum for odd

ADC R22, R1 ; add carry to R22 if carry flag set

INC R15 ; increment R15

JMP count\_dec ; jump to decrement counter

count\_dec:

DEC R14 ; decrement counter

BRNE L1 ; if not equal to zero, loop to L1

END: JMP END ; endless loop

Graphical user interface, text, application

Description automatically generated

Graphical user interface, application, Teams

Description automatically generatedExec time @16MHz

Table

Description automatically generatedFinal values at end of execution:

/\*

\* DA\_1b\_C.c

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\* Created: 2/20/2021 3:06:16 AM

\* Author : ElmerOMejia

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#include <stdio.h>

#define MAX 112 // define max constant

#define INITIAL 33 // deine initial value constant

int STARTADDS[MAX]; // array to store each integer

int EVENS[MAX/2]; // array to store each even integer

int ODDS[MAX/2]; // array to store each odd integer

int main() {

// integer variables for process

int i, x, y;

int counter;

int total;

int evenTotal;

int oddTotal;

int temp;

// initialize variables

counter = INITIAL;

total = 0;

evenTotal = 0;

oddTotal = 0;

temp = 0;

x = 0;

y = 0;

for (i = 0; i < MAX; i++){

STARTADDS[i] = counter; // store each int in STARTADDS array

total = total + counter; // running sum of total

temp = counter; // copy counter into a temporary int

if (temp % 2 == 0){ // check for even

EVENS[x] = counter; // store in EVEN array

evenTotal = evenTotal + counter; // running sum of even int

x++; // increment x

}

else { // else it is odd

ODDS[y] = counter; // store in ODD array

oddTotal = oddTotal + counter; // running sum of odd int

y++; // increment y

}

counter++; // increment counter

}

return 0;

}

Graphical user interface, text, application, Word

Description automatically generated

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“This assignment submission is my own, original work”.

Elmer Mejia