# DA1A Assembly Code

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; DA1A.asm

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;Set constants for the factors

.EQU X1 = 0x1361

.EQU X2 = 0xFDEC

start:

;Load constant X1 into R25:R24

LDI R25, HIGH(X1)

LDI R24, LOW(X1)

;Load constant X2 into R23:R22

LDI R23, HIGH(X2)

LDI R22, LOW(X2)

;set R21 to 0 for oh so many reasons

LDI R21, 0

ADD\_LOOP:

;Accumulate R24:R25 into R20:R19:R18:R17

ADD R17, R24

ADC R18, R25

ADC R19, R21

ADC R20, R21

;Decrement R23:R22 each time X1 is accumulated

SUBI R22, 1

SBC R23, R21

;Repeat the accumulation, unless both R23 and R22 are zero

CP R22, R21

BRNE ADD\_LOOP

CP R23, R21

BRNE ADD\_LOOP

DONE:

;Wait here when done, or break when simulating

RJMP DONE

# Atmel Studio 7 during debugging

1 iteration of the algorithm takes 15 cycles, 0.94 µs at 16MHz

Test calculation, 0x1361 × 0xFDEC, takes 585548 cycles, 36,596.75 µs at 16MHz

## Beginning of Task

|  |
| --- |
| *1 iteration* |
| *0x1361 × 0xFDEC* |

## End of Task

|  |
| --- |
| *1 iteration* |
| *0x1361 × 0xFDEC* |