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Class: Computer Systems (Thursday afternoon)

Title: Lab 9

4 – TIMER.asm contains a function which runs a dumb timer. The input to this function, which is $0F0000, is stored in the register r2.

FACTORIALJ.asm contains a recursive function which calculates the factorial of a number. The input number to this function, which is 4, is stored in the register r1.

Kernel7.asm contains code to calculate the factorial of a number and make an LED flash that number of times via GPIO18.

5 – Decomposed code

TIMER.asm

TIMER:

wait1$:

sub r2,#1

cmp r2,#0

bne wait1$

bx lr

factorialj.asm

FACTORIAL:

sub r1,r1,#1

cmp r1,#1

beq EXIT

mul r0,r0,r1

push {r1,lr}

bl FACTORIAL

EXIT:

pop {r1,lr}

bx lr

gpio\_setup.asm

SETUP:

BASE=$3F000000

GPIO\_OFFSET=$200000

mov r0,BASE

orr r0,GPIO\_OFFSET

mov r1,#1

lsl r1,#24

str r1,[r0,#4]

bx lr

gpio\_on.asm

GPIO\_ON:

mov r1,#1

lsl r1,#18

str r1,[r0,#28]

bx lr

gpio\_off.asm

GPIO\_OFF:

mov r1,#1

lsl r1,#18

str r1,[r0,#40]

bx lr

kernel7.asm

mov r1,#4

mov sp,#1000

mov r0,r1

bl FACTORIAL

mov r7,r0

bl SETUP

loop$:

bl GPIO\_ON

mov r2,$0F0000

bl TIMER

bl GPIO\_OFF

mov r2,$0F0000

bl TIMER

sub r7,#1

cmp r7,#0

bne loop$

wait:

b wait

include “TIMER.asm”

include “factorialj.asm”

include “gpio\_setup.asm”

include “gpio\_on.asm”

include “gpio\_off.asm”