

Übungsblatt 3

Übungsgruppe Pentium

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Aufgabe 1)

___ /5p.

```

main:
    add t1, zero, Zeichenkette
    add t3, zero, zero
    nop

Loop:
    lb  t2, 0(t1)
    nop
    nop
    beq t2, zero, Finish
    nop
    nop
    nop
    add t3, t3, 1
    add t1, t1, 1
    nop
    j   Loop
    nop
    nop
    nop

Finish:
    sw  t3, Laenge(zero)
    add a0, zero, 0
    add a7, zero, 93
    nop
    nop
    scall

```

Aufgabe 2)

___ /4p.

```

.data 0x300
num: .space 4
res: .space 4

.text

main:
    lw  t0, num(zero)    # t0 = num
    add t1, t0, 0        # t1 = num, added each iteration
    add t2, t0, -2       # when t2=2 we need to run loop once, therefore
                        # t2-2 < 0 is our exit condition at loop start

loop:
    blt t2, zero, end    # jump when t2 < 0
    add t2, t2, -1       # t2--
    add t0, t0, t1       # t0 += t1
    j   loop

end:
    sw  t0, res(zero)
    add a0, zero, 0      # status code 0
    add a7, zero, 93     # syscall exit
    scall

```

Aufgabe 3)

___ /6p.

```

.data
str: .asciiz "Ich mag Informatik! 123?"
    .align 2

.text

main:
    add s0, zero, 0      # s0 = 0 (iterator)
    # set up constant vars for to_upper function
    add t0, zero, 96     # const t0 = 97
    add t1, zero, 123    # const t1 = 123

loop_start:
    lb  a0, str(s0)      # a0 = str[s0]
    beq a0, zero, end     # if (a0 == 0) break
    jal to_upper         # a0 = to_uppercase(a0)
    sb  a0, str(s0)      # str[s0] = a0
    add s0, s0, 1        # a0++
    j   loop_start

end:
    add a7, zero, 93     # call exit
    scall

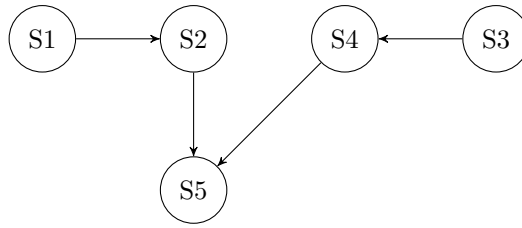
# a0 = to_uppercase(a0)
to_upper:
    bge a0, t0, _to_upper_is_ge_97 # if !(a0 >= 97)
    ret                             # return
_to_upper_is_ge_97:
    bge t0, a0, _to_upper_ret      # return if 123 >= a0
    # if we are here, a0 element of [97, 122]
    # lower to upper: lower - 32
    add a0, a0, -32               # a0 -= 32
_to_upper_ret:
    ret

```

Aufgabe 4)

___ /2+3+3p.

a)



b)

```

mul t3, t1, t3
nop
nop
add t2, t2, t3
mul t1, t1, t1
nop
nop
mul t4, t4, t1
nop
nop
add t2, t2, t4

```

c)

```

.data
.text
main:
mul t3, t1, t3
mul t1, t1, t1
nop
add t2, t2, t3
mul t4, t4, t1
nop
nop
add t2, t2, t4

add a7, zero, 93
scall

```

Gesamtpunkte:

___ /23p.