

Prvi kolokvijum iz Operativnih sistema 1

Odsek za računarsku tehniku i informatiku

April 2018.

1. (10 poena)

```
const REG ESC = 0;
bool complete = false;

void transfer () {
    REG data = ESC;

    *io1Ctrl = 1;
    *io2Ctrl = 1;
    *io3Ctrl = 1;
    *io4Ctrl = 1;

    while (!complete) {
        while (*io1Status&1==0);
        data = *io1Data;

        if (data==ESC) break;

        while (*io3Status&1==0);
        *io3Data = data;
    }

    complete = true;
    *io1Ctrl = 0;
    *io2Ctrl = 0;
    *io3Ctrl = 0;
    *io4Ctrl = 0;
}

interrupt void device2 () {
    if (complete) return;
    REG data = *io2Data;
    if (data!=ESC) {
        while (*io4Status&1==0);
        *io4Data = data;
    } else {
        complete = true;
        *io1Ctrl = 0;
        *io2Ctrl = 0;
        *io3Ctrl = 0;
        *io4Ctrl = 0;
    }
}
```

2. (10 poena)

```
sys_call:    ; Save r0 and r1 on the (kernel) stack
            push r0
            push r1
            load r0, [running] ; the old running is in r0

            ; Perform the system call:
            call sys_call_proc

            ; Compare the old and the new running,
            load r1, [running] ; the new running is in r1
            cmp r0, r1
            jne switch

            ; and do not switch the context if they are equal,
            ; but restore r0 and r1, and return
            pop r1
            pop r0
            iret

switch:     ; Save the context of the old running
            store r2,#offsR2[r0] ; save other regs
            store r3,#offsR3[r0]
            ...
            store r31,#offsR31[r0]
            store sp,#offsSP[r0] ; save sp
            pop r1 ; save r1 through r1
            store r1,#offsR1[r0]
            pop r1 ; save r0 through r1
            store r1,#offsR0[r0]
            pop r1 ; save psw through r1
            store r1,#offsPSW[r0]
            pop r1 ; save pc through r1
            store r1,#offsPC[r0]

            ; Restore the context of the new running
            load r0,[running]
            load r1, #offsPC[r0] ; restore pc through the stack
            push r1
            load r1, #offsPSW[r0] ; restore psw through the stack
            push r1
            load sp,#offsSP[r0] ; restore sp
            load r31,#offsR31[r0] ; restore r31
            ... ; restore other regs
            load r1,#offsR1[r0]
            load r0,#offsR0[r0] ; restore r0
            ; and return
            iret
```

3. (10 poena)

```
extern D fun (A a, B b, C c);
typedef void (*CallbackD) (D);

struct fun_params { A a; B b; C c; CallbackD cb; };

void fun_async (A a, B b, C c, CallbackD cb) {
    fun_params* params = new fun_params;
    params->a = a; params->b = b; params->c = c;
    params->cb = cb;
    pthread_t pid;
    pthread_create(&pid, &fun_wrapper, params);
}

void fun_wrapper (void* params) {
    fun_params* p = (fun_params*)params;
    D d = fun(p->a, p->b, p->c);
    CallbackD callback = p->cb;
    delete p;
    callback(d);
}
```