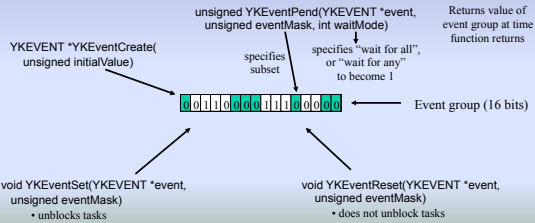


## Lab 7: Event flags

- You add functions to create, pend on, set, and reset event flags.



## Lab 7 application code

```
/* File: lab7app.c
Description: Application code for
EE 425 lab 7 (Event flags) */

#include "cib.h"
#include "yak.h" /* kernel definitions */
#include "lab7defs.h"
#define TASK_STACK_SIZE 512

YKEVENT *charEvent;
YKEVENT *numEvent;
```

```
int CharTaskSx[TASK_STACK_SIZE];
int AllCharsTaskSx[TASK_STACK_SIZE];
int AllNumsTaskSx[TASK_STACK_SIZE];
int STaskSx[TASK_STACK_SIZE];

void main(void) {
    YKinitialize();
    charEvent = YKEventCreate(0);
    numEvent = YKEventCreate(0);
    YKNewTask(Stask, (void *)
    &STaskSx[TASK_STACK_SIZE], 0);
    YKRun();
}
```

```
/* File: lab7defs.h
Description: Required definitions
for EEEn 425 lab 7 (Event flags) */
```

```
#define EVENT_A_KEY 0x1
#define EVENT_B_KEY 0x2
#define EVENT_C_KEY 0x4

#define EVENT_1_KEY 0x1
#define EVENT_2_KEY 0x2
#define EVENT_3_KEY 0x4
```

```
/* Interrupt handler code from myinith.c */
```

```
void mykeybrd(void) {
    char c;
    c = KeyBuffer;
    if (c == 'a') YKEventSet(charEvent, EVENT_A_KEY);
    else if (c == 'b') YKEventSet(charEvent, EVENT_B_KEY);
    else if (c == 'c') YKEventSet(charEvent, EVENT_C_KEY);
    else if (c == 'd') YKEventSet(charEvent, EVENT_A_KEY |
    EVENT_B_KEY | EVENT_C_KEY);
    else if (c == '1') YKEventSet(numEvent, EVENT_1_KEY);
    else if (c == '2') YKEventSet(numEvent, EVENT_2_KEY);
    else if (c == '3') YKEventSet(numEvent, EVENT_3_KEY);
    else {
        print("mkKEYPRESS (%i)", 11);
        printChar(c);
        print(" IGNORED\n", 10);
    }
}
```

## Lab 7 application code

```
void CharTask(void) /* waits for any events triggered by letter keys */
{
    unsigned events;
    printString("Started CharTask (2)\n");
    while (1) {
        events = YKEventPend(charEvent, EVENT_A_KEY |
        EVENT_B_KEY | EVENT_C_KEY, EVENT_WAIT_ANY);
        if (events == 0) {
            printString("Oops! At least one event should be set in return value!\n");
        }
        if (events & EVENT_A_KEY) {
            printString("CharTask (A)\n");
            YKEventReset(charEvent, EVENT_A_KEY);
        }
        if (events & EVENT_B_KEY) {
            printString("CharTask (B)\n");
            YKEventReset(charEvent, EVENT_B_KEY);
        }
        if (events & EVENT_C_KEY) {
            printString("CharTask (C)\n");
            YKEventReset(charEvent, EVENT_C_KEY);
        }
    }
}
```

## Lab 7 application code

```
void AllCharsTask(void) /* waits for all events triggered by letter keys */
{
    unsigned events;
    printString("Started AllCharsTask (3)\n");
    while (1) {
        events = YKEventPend(charEvent, EVENT_A_KEY | EVENT_B_KEY | EVENT_C_KEY,
        EVENT_WAIT_ALL);
        // To be reset by WaitForAny task

        if (events != 0) {
            printString("Oops! Char events weren't reset by CharTask!\n");
            printString("AllCharsTask (D)\n");
        }
    }
}

void AllNumsTask(void) /* waits for events triggered by number keys */
{
    unsigned events;
    printString("Started AllNumsTask (1)\n");
    while (1) {
        events = YKEventPend(numEvent, EVENT_1_KEY | EVENT_2_KEY | EVENT_3_KEY,
        EVENT_WAIT_ALL);

        if (events != (EVENT_1_KEY | EVENT_2_KEY | EVENT_3_KEY)) {
            printString("Oops! All events should be set in return value!\n");
        }
    }
}

printString("AllNumsTask (123)\n");
YKEventReset(numEvent, EVENT_1_KEY | EVENT_2_KEY | EVENT_3_KEY);
}
```

## Lab 7 application code

```
void STask(void) /* tracks statistics */
{
    unsigned max, switchCount, idleCount;
    int tmp;
    YKDelayTask(1);
    printString("Welcome to the YAK kernel!\n");
    printString("Determining CPU capacity!\n");
    YKDelayTask(1);
    YKIdleCount = 0;
    YKDelayTask(5);
    max = YKIdleCount / 25;
    YKIdleCount = 0;

    YKNewTask(CharTask, (void *) &CharTaskSx[TASK_STACK_SIZE], 2);
    YKNewTask(AllNumsTask, (void *) &AllNumsTaskSx[TASK_STACK_SIZE], 1);
    YKNewTask(AllCharsTask, (void *) &AllCharsTaskSx[TASK_STACK_SIZE], 3);
    while (1) {
        YKDelayTask(20);
        YKEnterMutex();
        switchCount = YKCtxSwCount;
        idleCount = YKIdleCount;
        YKExitMutex();

        printString("<<<<< Context switches: ");
        printInt(int)switchCount;
        printString(", CPU usage: ");
        tmp = (int) (idleCount/max);
        printInt(100-tmp);
        printString("%>>>>>\n");
        YKEnterMutex();
        YKCtxSwCount = 0;
        YKIdleCount = 0;
        YKExitMutex();
    }
}
```

## Example output

```
You press: 'a' -> CharTask (A)
           's' -> KEYPRESS (s) IGNORED
           'c' -> CharTask (C)
           'b' -> <<<<< Context switches: 7, CPU usage: 2% >>>>>
                CharTask (B)
           'd' -> CharTask (A)
                CharTask (B)
                CharTask (C)
                AllCharsTask (D)
           '2' -> <<<<< Context switches: 4, CPU usage: 1% >>>>>
           'f' -> KEYPRESS (f) IGNORED
           '3' ->
           '1' -> AllNumsTask (123)
                :
```