

# Fundamente de ingineria calculatoarelor

## Laborator 3

### 1. Little Man Computer: Multiplication

```

    INP
    STA num1
    INP
    STA num2
loop  LDA total
    ADD num1
    STA total
    LDA num2
    SUB one
    STA num2
    BRP loop
    LDA total
    SUB num1
    STA total
    OUT
    HLT
num1  DAT
num2  DAT
total DAT 0
one   DAT 1

```

### 2. Little Man Computer: Division

```

    INP
    STA num1
    INP
    STA num2
loop  LDA num2
    SUB num1
    BRZ end2
    BRP end
    LDA num1
    SUB num2
    STA num1
    LDA count
    ADD one
    STA count

```

```

    BRA loop
end  LDA count
    OUT
    HLT
End2 LDA count
    ADD one
    OUT
    HLT
num1  DAT
num2  DAT
count DAT 0
one   DAT 1

```

### 3. Little Man Computer: Alarm System

```

START  INP
        SUB PINCODE
        BRZ DEACTIVATE
        LDA WRONGCODE
        OUT
        LDA COUNTER
        SUB ONE
        STA COUNTER
        BRP START
        BRA ALARM
        HLT
DEACTIVATE LDA TRUE
        OUT
        HLT
ALARM     LDA FALSE
        OUT
        HLT
ONE       DAT 1
COUNTER   DAT 2
PINCODE   DAT 123
TRUE      DAT 1
FALSE     DAT -1
WRONGCODE DAT 9

```

### 4. Little Man Computer: Fibonacci

$F_0 = 0$  and  $F_1 = 1$ .  
 $F_n = F_{n-1} + F_{n-2}$

```

    INP
    STA F0
    INP
    STA F1
    INP
    STA n
loop  LDA n
      BRZ finish
      SUB one
      STA n
      LDA F0
      ADD F1
      STA FN
      OUT
      LDA F1
      STA F0
      LDA FN
      STA F1
      BRA loop
finish LDA FN
      SUB FN
      HLT
F0    DAT
F1    DAT
FN    DAT
n     DAT
one   DAT 1

```

## 5. Little Man Computer: Power of two

```

    INP
    STA num
    INP
    STA power
    SUB one
    STA power
loop LDA power
      BRZ end
      SUB one
      STA power
      LDA num
      ADD num
      STA num
      BRP loop

end LDA num
  OUT
  SUB num
  STA num
  HLT

num DAT
power DAT
one DAT 1

```