Introduktion til Programmering og Problemløsning (PoP)

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2020/09/07

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Krav til Software

- Funktionalitet: Kompilerer det, løser det opgaven?

- Pålideligt: Hvad vis internettet falder ud?

- Brugsvenligt: Er det nemt at bruge?

- Effektivitet: Tager det lang tid at bruge, er det langsomt?

- Vedligeholdelse: Er det net at rette bugs, at tilføje ny funktionalitet?

- Portérbart: Kan det nemt flyttes til en ny computer, telefon, etc.?

Decimal til Binær

Program (.fsx)

```
/// Convert a non-negative integer into its
/// binary form. E.g., dec2bin 3 = "0b11"
let dec2bin n =
  if n < 0 then
    "Illegal value"
  elif n = 0 then
    "0b0"
  else
    let mutable v = n
    let mutable str = ""
    while v > 0 do
      str <- (string (v % 2)) + str
      v <- v / 2
    "0b" + str
let N = 116
printfn "%d_10 = %s_2" N (dec2bin N)
```

Implementation (.fsi)

```
module convert

/// <summary> Convert a non-negative integer into its binary
/// form. E.g., dec2bin 3 = "0b11".</summary>
/// <example>The call <c>dec2bin 3</c> returns <c>"0b11"</c>.</example>
/// <param name="n">a non-negative integer.</param>
/// <returns>The binary representation of n as a string on Fsharp form </returns>
val dec2bin : n:int -> string
```

Application (.fsx)

```
open convert

let N = 116
printfn "%d_10 = %s_2" N (dec2bin N)
```

Black-box testing

1. Beslut et interface

2. Find grænsetilfælde

Implementation (.fsi)

module convert

/// <summary> Convert a non-negative integer into its binary
/// form. E.g., dec2bin 3 = "0b11".</summary>
/// <example>The call <c>dec2bin 3</c> returns <c>"0b11"</c>.</example>
/// <param name="n">a non-negative integer.</param>
/// <returns>The binary representation of n as a string on Fsharp form </returns>
val dec2bin : n:int -> string

let dec2bin n = ?

Unit	Case	Expected output	Comment
dec2bin n	n = -1	"Illegal value"	negative tal
	n = 0	"0b0"	grænsetilfælde
	n = 1	"0b1"	1 bit
	n = 2	"0b10"	2 bit
	n = 10	"0b1010"	stort lige tal (venstre bit sat men ikke højre)
	n = 11	"0b1011"	stort ulige tal (venstre og højre bit sat)

Black-box testing

Unit	Case	Expected output	Comment
dec2bin n	n = -1	"Illegal value"	negative tal
	n = 0	"0b0"	grænsetilfælde
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```
open convert

printfn "Black-box testing of dec2bin n"
printfn "  %5b: n < 0" (dec2bin -1 = "Illegal value")
printfn "  %5b: n = 0" (dec2bin 0 = "0b0")
printfn "  %5b: n = 1" (dec2bin 1 = "0b1")
printfn "  %5b: n = 2" (dec2bin 2 = "0b10")
printfn "  %5b: n = 10" (dec2bin 10 = "0b1010")
printfn "  %5b: n = 11" (dec2bin 11 = "0b1011")
```

```
$ fsharpc -a dec2bin.fsi dec2bin.fs
$ fsharpc -r dec2bin.dll dec2binBlackTest.fsx
$ mono dec2binBlackTest.exe
Black-box testing of dec2bin n
    true: n < 0
    true: n = 0
    true: n = 1
    true: n = 2
    true: n = 10
    true: n = 11
```

Resumé

I denne video hørte du om:

- Krav til software

- Programspecifikation

- Black-box testing