

Lösningsförslag till dugga 1 i TMEL53 Digitalteknik M 2012-01-20

1a)

$765/2$	$=$	382	REST 1	LSB
$382/2$	$=$	191	REST 0	
$191/2$	$=$	95	REST 1	
$95/2$	$=$	47	REST 1	
$47/2$	$=$	23	REST 1	
$23/2$	$=$	11	REST 1	
$11/2$	$=$	5	REST 1	
$5/2$	$=$	2	REST 1	
$2/2$	$=$	1	REST 0	
$1/2$	$=$	0	REST 1	MSB

↑
"LASRIKTHING"

$$765_{10} = 1011111101_2$$

1b)

$$765_{10} = 011101100101_{NBCD}$$

$\underbrace{\hspace{1.5cm}} \quad \underbrace{\hspace{1.5cm}} \quad \underbrace{\hspace{1.5cm}}$
 7 6 5

2a)

$$111011111001_2 = EF9_{16}$$

$\underbrace{\hspace{1.5cm}} \quad \underbrace{\hspace{1.5cm}} \quad \underbrace{\hspace{1.5cm}}$
 E F 9

2b)

$$111011111001_2 = 7371_8$$

$\underbrace{\hspace{1.5cm}} \quad \underbrace{\hspace{1.5cm}} \quad \underbrace{\hspace{1.5cm}} \quad \underbrace{\hspace{1.5cm}}$
 7 3 7 1

3a) DIVISION MED TVÅ ⁰ ⇒ SKIFTA ETT STEG TILL HÖGER

$$0001,1100_2 \text{ DIVIDERAT MED TVÅ} = 0000,1110_2$$

3b) $0000,1110_2 =$

$$= 0 \cdot 2^3 + 0 \cdot 2^2 + 0 \cdot 2^1 + 0 \cdot 2^0 + 1 \cdot 2^{-1} + 1 \cdot 2^{-2} + 1 \cdot 2^{-3} + 0 \cdot 2^{-4} =$$

$$= \frac{1}{2} + \frac{1}{4} + \frac{1}{8} = 0,875_2$$

4a)

$$\begin{array}{r}
 1110010 \quad \leftarrow 114 \\
 \cdot 1101 \quad \leftarrow 13 \\
 \hline
 1110010 \\
 0000000 \\
 1110010 \\
 + 1110010 \\
 \hline
 10111001010 \quad \leftarrow 1482
 \end{array}$$

$$1110010_2 \cdot 1101_2 = 10111001010_2$$

4b)

$$\begin{array}{r}
 \overset{10}{11} \overset{10}{00} \overset{10}{10} \\
 110010 \quad \leftarrow 114 \\
 - 1101 \quad \leftarrow 13 \\
 \hline
 1100101 \quad \leftarrow 101
 \end{array}$$

$$1110010_2 - 1101_2 = 1100101_2$$

$$5a) \quad + 0,8750_{10} = 0,1110_2$$

$$0,1110$$

$$1,0001 \quad \text{INVERTERA}$$

$$+ \quad \quad \quad 1 \quad \text{ADDERA 1}$$

$$\hline 1,0010$$

$$- 0,8750_{10} = 1,0010 \quad (2\text{-KOMPLEMENTET})$$

5b)

$$0,6250 \cdot 2 = 0,25 + 1 \quad \text{MSB}$$

$$0,25 \cdot 2 = 0,5 + 0$$

$$0,5 \cdot 2 = 0 + 1 \quad \text{LSB}$$

LÖSUNG

$$0,6250_{10} = 0,1010_2$$

$$+ \quad \begin{array}{r} 0,1010 \\ 1,0010 \\ \hline 1,1100 \end{array} \leftarrow - 0,2500$$

↑
ZEICHENBIT 1 = MINUS

0 = PLUS

$$(0,6250 - 0,8750 = - 0,2500)$$