

## RV02: IEEE-754

- 1) V enojni natančnosti po standardu IEEE-754 v binarni in heksadecimalni obliki zapišite števili 3,75 in -3,625.

a) 3,75

Predznak: 0

Eksponent: 10000000

Mantisa: 1110000000000000000000

Združimo: 01000000011100000000000000000000

Handwritten calculations for the IEEE-754 representation of 3.75:

3,75

$3 = 1 \cdot 2 + 1$   
 $2 = 0 \cdot 2 + 1$       $11,11\dots$

predznak: 0     eksponent:  $1,111\dots \cdot 2^1$

mantisa: 0100 0000 0111 0000  
 0000 0000 0000 0000

binarna oblika

4 0 7 0  
 0 0 0 0

40700000 ~ heksadecimalen zapis

mantisa  
 $0,75 \cdot 2 = 1,5$   
 $0,5 \cdot 2 = 1,0$   
 $0,0 \cdot 2 = 0,0$

predznak: 0

eksponent  
 $(2^{8-1}-1) + 1 = 128$

$128 = 64 \cdot 2 + 0$   
 $64 = 32 \cdot 2 + 0$   
 $32 = 16 \cdot 2 + 0$   
 $16 = 8 \cdot 2 + 0$   
 $8 = 4 \cdot 2 + 0$   
 $4 = 2 \cdot 2 + 0$   
 $2 = 1 \cdot 2 + 0$   
 $1 = 0 \cdot 2 + 1$

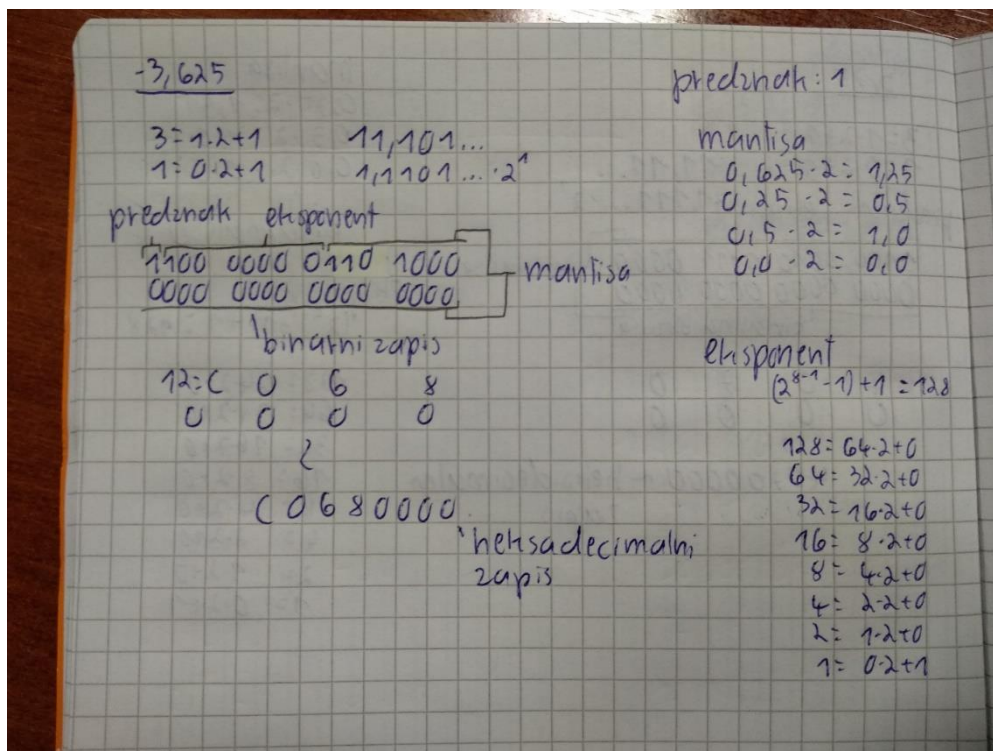
b) -3,625

Predznak: 1

Eksponent: 10000000

Mantisa: 1101000000000000000000

Združimo: 110000000110100000000000000000



- 2) V dvojni natančnosti po standardu IEEE-754 v binarni in heksadecimalni obliki zapišite števili -16,735 in -233,75.

a) -16,735

Predznak: 1

EkspONENT: 10000000011

Mantisa: 0000101111000010100011110101110000101000111101011100

Združimo: 1100000000110000101111000010100011110101110000101000111101011100

-16,735

$16 = 8 \cdot 2 + 0$   
 $8 = 4 \cdot 2 + 0$   
 $4 = 2 \cdot 2 + 0$   
 $2 = 1 \cdot 2 + 0$   
 $1 = 0 \cdot 2 + 1$

$10000, 1011110000 \dots$   
 $10000, 1011110000 \dots \cdot 2^4$

/ ker je negativen  
 predznak: 1  
 mantisa  
 $0,735 \cdot 2 = 1,47$   
 $0,47 \cdot 2 = 0,94$   
 $0,94 \cdot 2 = 1,88$   
 $0,88 \cdot 2 = 1,76$   
 $0,76 \cdot 2 = 1,52$   
 $0,52 \cdot 2 = 1,04$   
 $0,04 \cdot 2 = 0,08$   
 $0,08 \cdot 2 = 0,16$   
 $0,16 \cdot 2 = 0,32$   
 $0,32 \cdot 2 = 0,64$   
 $0,64 \cdot 2 = 1,28$   
 $0,28 \cdot 2 = 0,56$   
 $0,56 \cdot 2 = 1,12$   
 $0,12 \cdot 2 = 0,24$   
 $0,24 \cdot 2 = 0,48$   
 $0,48 \cdot 2 = 0,96$   
 $0,96 \cdot 2 = 1,92$   
 $0,92 \cdot 2 = 1,84$   
 $0,84 \cdot 2 = 1,68$   
 $0,68 \cdot 2 = 1,36$   
 $0,36 \cdot 2 = 0,72$   
 $0,72 \cdot 2 = 1,44$   
 $0,44 \cdot 2 = 0,88$   
 $0,88 \cdot 2 = 1,76$

eksponent  
 $(2^{11-1} - 1) + 4 = 1023$   
 $1023 = 512 \cdot 2 + 1$   
 $512 = 256 \cdot 2 + 1$   
 $256 = 128 \cdot 2 + 0$   
 $128 = 64 \cdot 2 + 0$   
 $64 = 32 \cdot 2 + 0$   
 $32 = 16 \cdot 2 + 0$   
 $16 = 8 \cdot 2 + 0$   
 $8 = 4 \cdot 2 + 0$   
 $4 = 2 \cdot 2 + 0$   
 $2 = 1 \cdot 2 + 0$   
 $1 = 0 \cdot 2 + 1$

predznak eksponent  
 1 1000 0000 0011 0000  
 1011 1100 0010 1000  
 1111 0101 1100 0010  
 1000 1111 0101 1100  
 8 4 2 1 8 4 2 1 8 4 2 1

binarna oblika  
 12=C 0 3=3 0  
 11=B 12=C 2=2 8=8  
 15=F 5=5 12=C 2=2  
 8=8 15=F 5=5 12=C  
 1 6 3 0  
 B C 2 8  
 F 5 C 2  
 8 F 5 C  
 ↕  
 heksadecimalen zapis

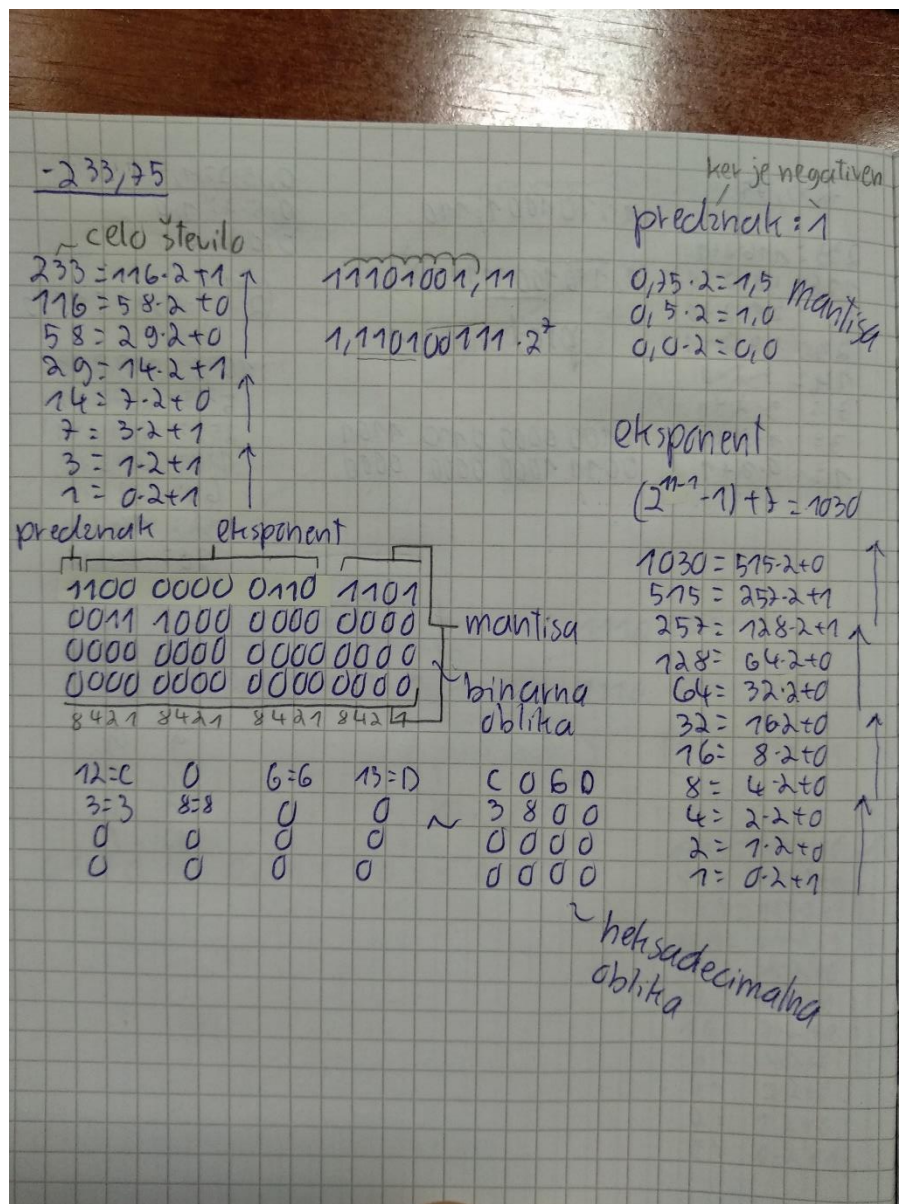
b) -233,75

Predznak: 1

EkspONENT: 10000000110

Mantisa: 11010011100

Združimo: 110000000110110100111000





- Računamo: 400,625

