

Sistemi I - Domača naloga 1

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Naloga 1. Samo z uporabo postulatov Boolove algebre (p1 – p5) dokažite pravilo dvojne negacije $x = x$. Namig: zgledujte se po dokazu idempotence.

1) $\neg\neg X = X$

$$\begin{aligned}
 \neg\neg X &= \neg\neg X \\
 &= \neg\neg X + 0 \\
 &= \neg\neg X + (X \cdot \neg X) \\
 &= (\neg\neg X + X) \cdot (\neg\neg X + \neg X) \quad \text{p3 --- distributivnost} \\
 &= (X + X) \cdot (X + \neg X) \\
 &= X + (X \cdot \neg X) \\
 &= X + 1 \\
 &= X
 \end{aligned}$$

Naloga 2. Pokažite, da lahko samo z logičnim operatorjem NOR realiziramo poljubno logično funkcijo.

2)

A	B	Q
1	1	0
1	0	0
0	1	0
0	0	1

$Q = A \text{ NOR } B$

z uporabo NOR na redimo lahko še ostala vrata, saj so ta univerzalna.

A	B	Q
1	1	1
1	0	0
0	1	0
0	0	0

$Q = A \text{ AND } B$

$Q = (A \text{ NOR } A) \text{ NOR } (B \text{ NOR } B)$

A	Q
1	0
0	1

$Q = \text{NOT}(A)$

$Q = A \text{ NOR } A$

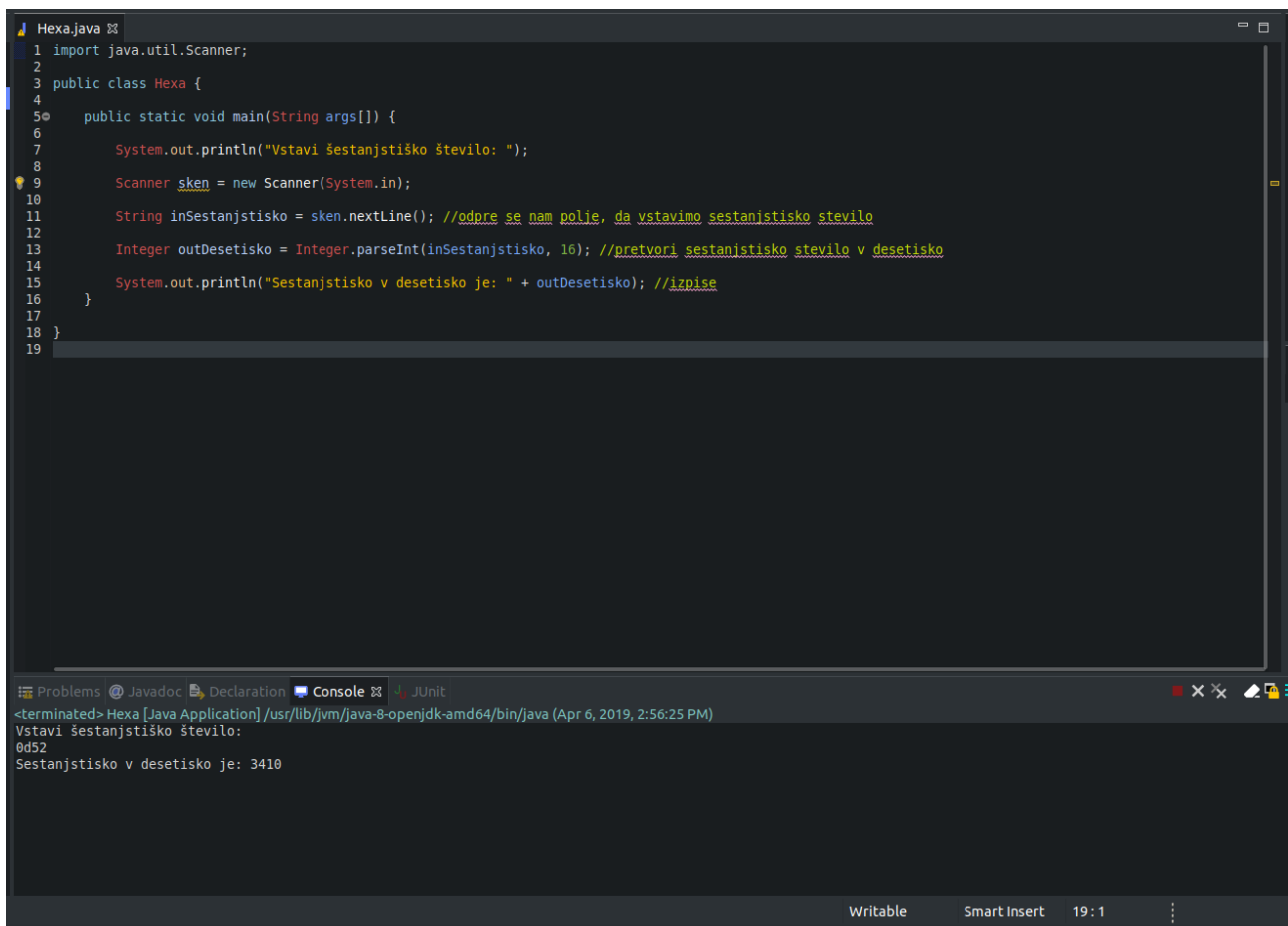
A	B	Q
1	1	1
1	0	1
0	1	1
0	0	0

$Q = A \text{ OR } B$

$Q = (A \text{ NOR } B) \text{ NOR } (A \text{ NOR } B)$

Naloga 3. Definirajte logično funkcijo p , ki izračuna sodi paritetni bit nad 4-bitnim številom $x_1x_2x_3x_4$. Vrednost paritetnega bita je nastavljena tako, da je skupno število enic v nizu bitov $x_1x_2x_3x_4p$ vedno sodo. Npr. $p(0000) = 0$, $p(0100) = 1$, $p(0110) = 0$, ...

Naloga 4. V poljubnem programskem jeziku napišite funkcijo, ki prejme nepredznačeno celo 16-bitno šestnajstiško število v obliki niza in vrne njegovo desetiško vrednost tipa integer. Primer: `hex2dec("0d52")` → 3410.



```
1 import java.util.Scanner;
2
3 public class Hexa {
4
5     public static void main(String args[]) {
6
7         System.out.println("Vstavi šestnajstiško število: ");
8
9         Scanner sken = new Scanner(System.in);
10
11         String inSestanjstisko = sken.nextLine(); //odpre se nam polje, da vstavimo sestanjstisko število
12
13         Integer outDesetisko = Integer.parseInt(inSestanjstisko, 16); //pretvori sestanjstisko število v desetisko
14
15         System.out.println("Sestanjstisko v desetisko je: " + outDesetisko); //izpiše
16     }
17 }
18
19
```

Problems Javadoc Declaration Console JUnit

<terminated> Hexa [Java Application] /usr/lib/jvm/java-8-openjdk-amd64/bin/java (Apr 6, 2019, 2:56:25 PM)

Vstavi šestnajstiško število:
0d52
Sestanjstisko v desetisko je: 3410

Writable Smart Insert 19:1

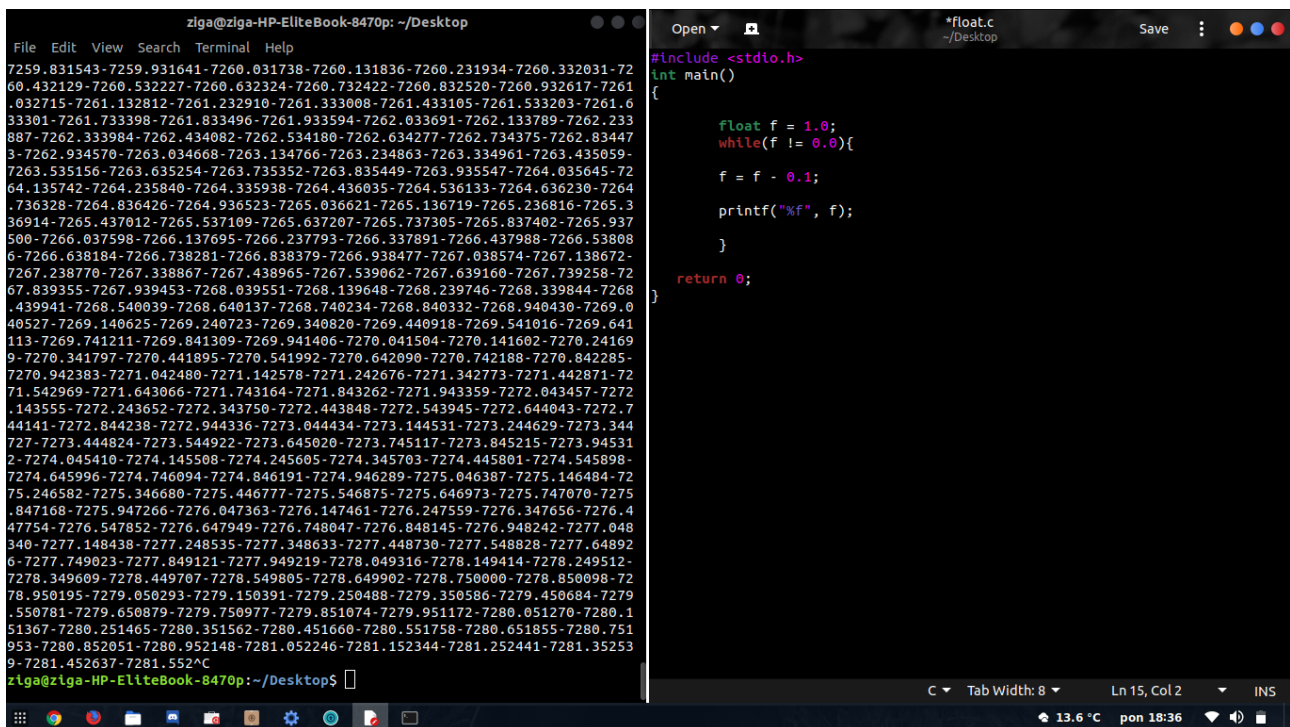
Naloga 5. V programskem jeziku C smo na sledeči način implementirali zanko, ki naj bi se izvršila desetkrat:

```
float f = 1.0;
while (f != 0.0) {
f = f - 0.1;
}
```

Komentirajte izvajanje takšnega programa in vrednost spremenljivke f po vsaki iteraciji zanke. Opišite, kako ste pristopili k raziskovanju tega problema ter podajte svoje končne ugotovitve.

Takšen program bi naj v zanki odšteval od spremenljivke f (začetna vrednost f je float 1.0), odšteval bi naj po enačbi $f = f - 0.1$. Če sklepamo, da se zanka desetkrat ponovi bomo na koncu dobili vrednost 0.0. Programček sem spisal v c jeziku in ga zagnal. Izpisal je veliko float vrednosti, ki so se odštevale.

Programček sem nato napisal še z vrednostmi integer in sem ugotovil, da deluje tako kot je zgoraj opisano. Float vrednost pa ne deluje pravilno, saj odštevava in se ne konča.



The image shows a screenshot of a computer screen with two windows. The left window is a terminal titled 'ziga@ziga-HP-EliteBook-8470p: ~/Desktop'. It displays the output of a C program, which is a long list of floating-point numbers. The right window is a code editor titled '*float.c ~/Desktop'. It shows the source code of the program, which is a C program that initializes a float variable f to 1.0 and enters a while loop that continues as long as f is not equal to 0.0. Inside the loop, f is decremented by 0.1, and the current value of f is printed using `printf("%f", f);`. The code ends with `return 0;`.

```
ziga@ziga-HP-EliteBook-8470p: ~/Desktop
File Edit View Search Terminal Help
7259.831543-7259.931641-7260.031738-7260.131836-7260.231934-7260.332031-72
60.432129-7260.532227-7260.632324-7260.732422-7260.832520-7260.932617-7261
.032715-7261.132812-7261.232910-7261.333008-7261.433105-7261.533203-7261.6
33301-7261.733398-7261.833496-7261.933594-7262.033691-7262.133789-7262.233
887-7262.333984-7262.434082-7262.534180-7262.634277-7262.734375-7262.83447
3-7262.934570-7263.034668-7263.134766-7263.234863-7263.334961-7263.435059-
7263.535156-7263.635254-7263.735352-7263.835449-7263.935547-7264.035645-72
64.135742-7264.235840-7264.335938-7264.436035-7264.536133-7264.636230-7264
.736328-7264.836426-7264.936523-7265.036621-7265.136719-7265.236816-7265.3
36914-7265.437012-7265.537109-7265.637207-7265.737305-7265.837402-7265.937
500-7266.037598-7266.137695-7266.237793-7266.337891-7266.437988-7266.53808
6-7266.638184-7266.738281-7266.838379-7266.938477-7267.038574-7267.138672-
7267.238770-7267.338867-7267.438965-7267.539062-7267.639160-7267.739258-72
67.839355-7267.939453-7268.039551-7268.139648-7268.239746-7268.339844-7268
.439941-7268.540039-7268.640137-7268.740234-7268.840332-7268.940430-7269.0
40527-7269.140625-7269.240723-7269.340820-7269.440918-7269.541016-7269.641
113-7269.741211-7269.841309-7269.941406-7270.041504-7270.141602-7270.24169
9-7270.341797-7270.441895-7270.541992-7270.642090-7270.742188-7270.842285-
7270.942383-7271.042480-7271.142578-7271.242676-7271.342773-7271.442871-72
71.542969-7271.643066-7271.743164-7271.843262-7271.943359-7272.043457-7272
.143555-7272.243652-7272.343750-7272.443848-7272.543945-7272.644043-7272.7
44141-7272.844238-7272.944336-7273.044434-7273.144531-7273.244629-7273.344
727-7273.444824-7273.544922-7273.645020-7273.745117-7273.845215-7273.94531
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47754-7276.547852-7276.647949-7276.748047-7276.848145-7276.948242-7277.048
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.550781-7279.650879-7279.750977-7279.851074-7279.951172-7280.051270-7280.1
51367-7280.251465-7280.351562-7280.451660-7280.551758-7280.651855-7280.751
953-7280.852051-7280.952148-7281.052246-7281.152344-7281.252441-7281.35253
9-7281.452637-7281.552735
ziga@ziga-HP-EliteBook-8470p:~/Desktop$
```

```
#include <stdio.h>
int main()
{
    float f = 1.0;
    while(f != 0.0){
        f = f - 0.1;
        printf("%f", f);
    }
    return 0;
}
```