Национальный исследовательский университет «МИЭТ»

Институт интегральной электроники (группа ЭН-14М, каф. ПКИМС)

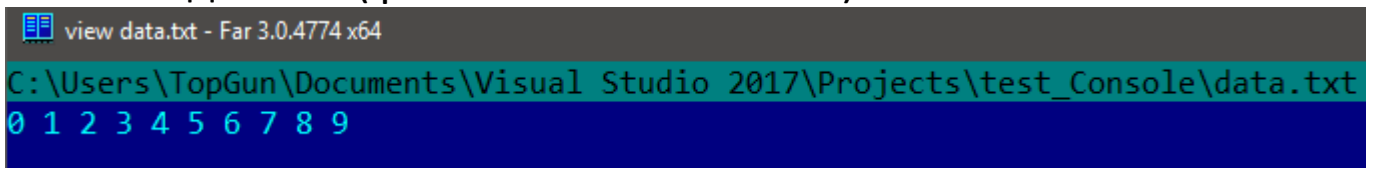
Компьютерные технологии в научных исследованиях

Семинар №4

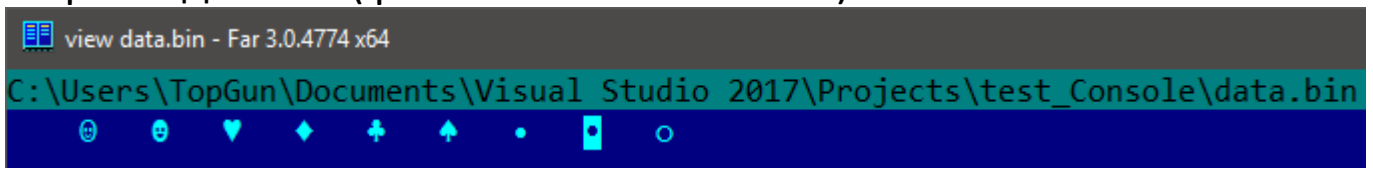
Текстовые форматы представления данных

Преимущество использования бинарных данных (3)

Текстовые данные (файл занимает 20 байт)

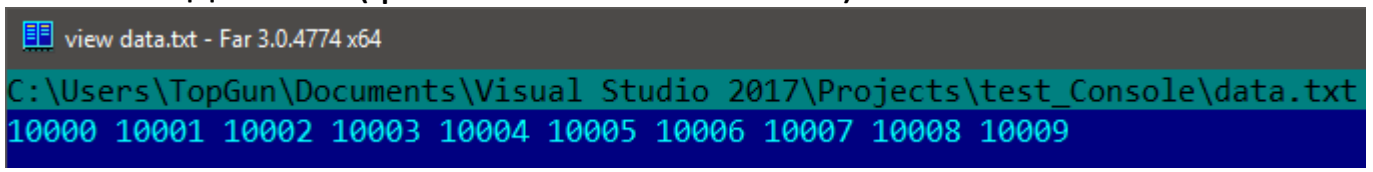


Бинарные данные (файл занимает 40 байт)

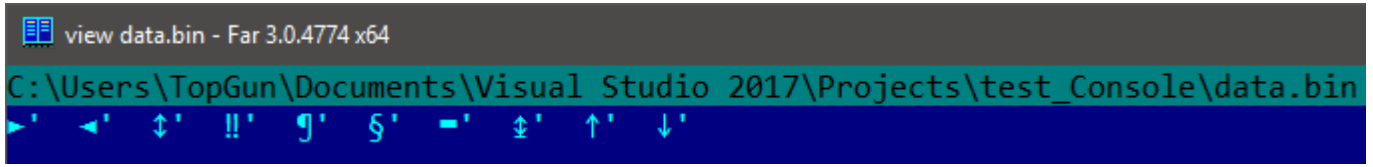


10 чисел
от 0

Текстовые данные (файл занимает 60 байт)



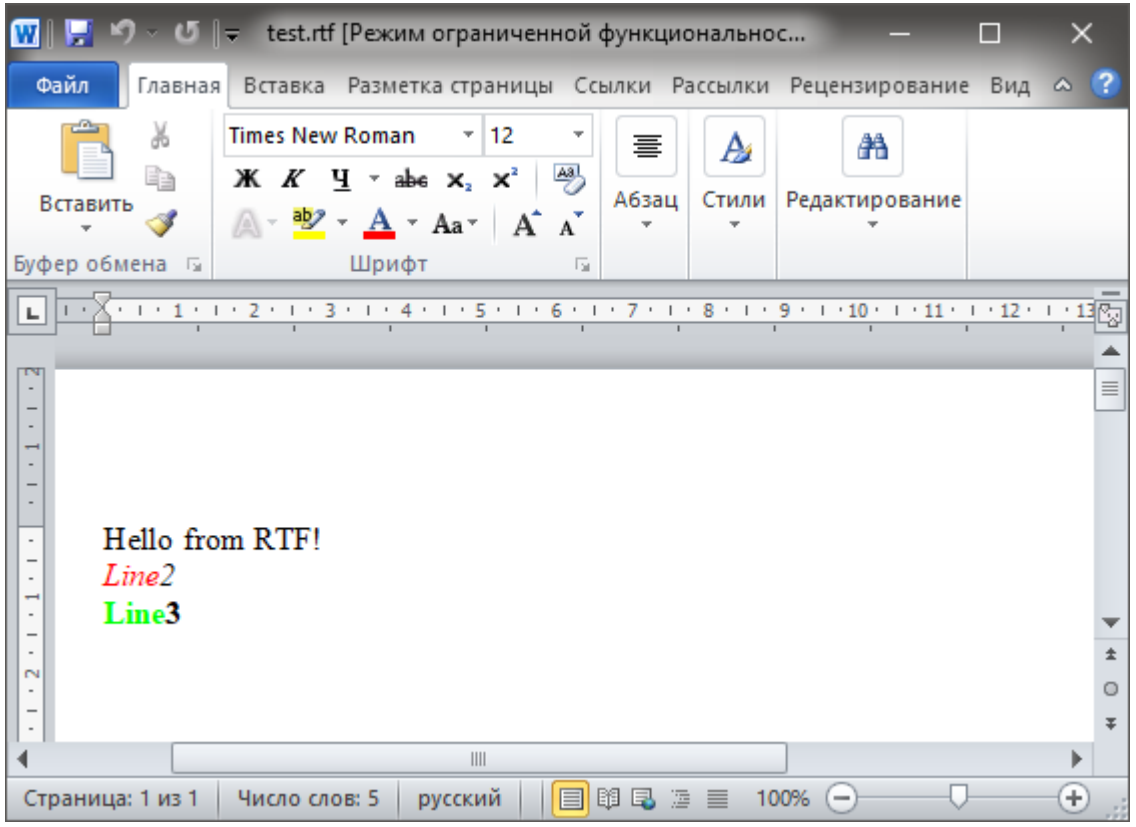
Бинарные данные (файл занимает 40 байт)



10 чисел
от 10000

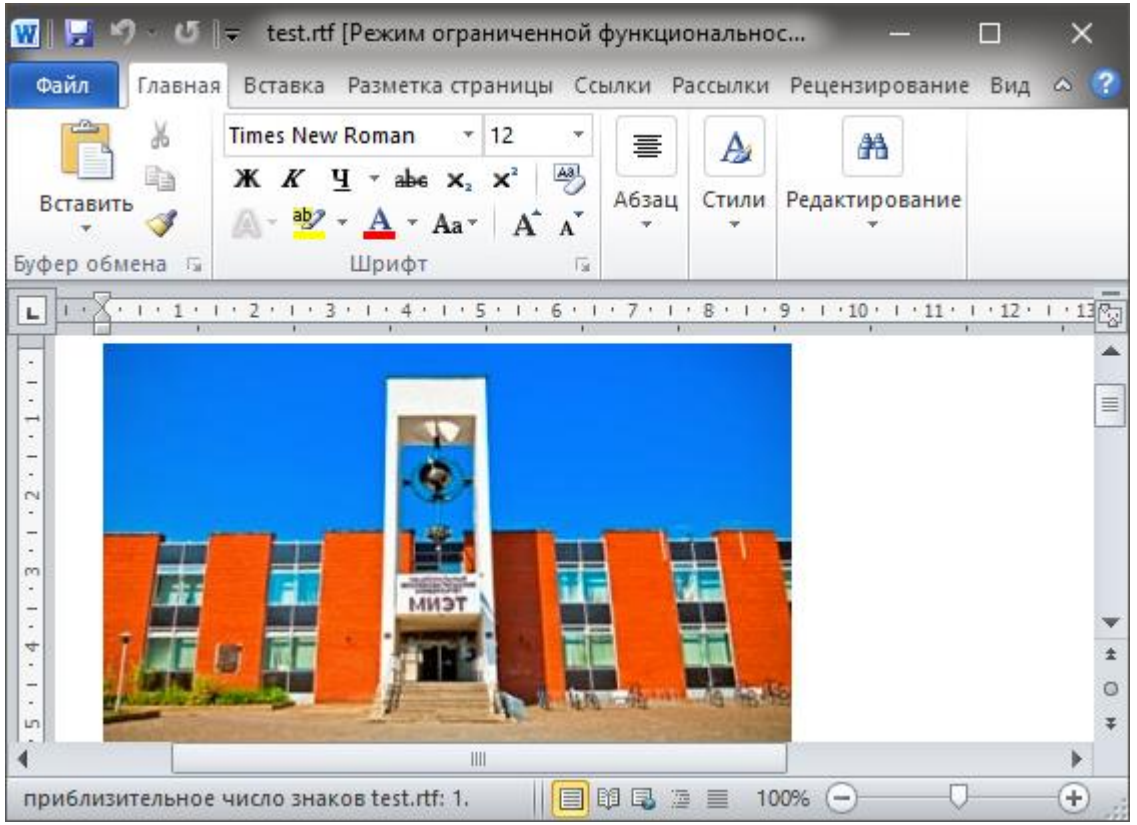
RTF и разметка текста (1)

```
{\rtf1
{\colortbl;\red0\green0\blue0;\red255\green0\blue0;
          \red0\green255\blue0;}
Hello from RTF!\line
{\i\cf2 Line\cf1 2}\line
{\b\cf3 Line\cf1 3}
}
```

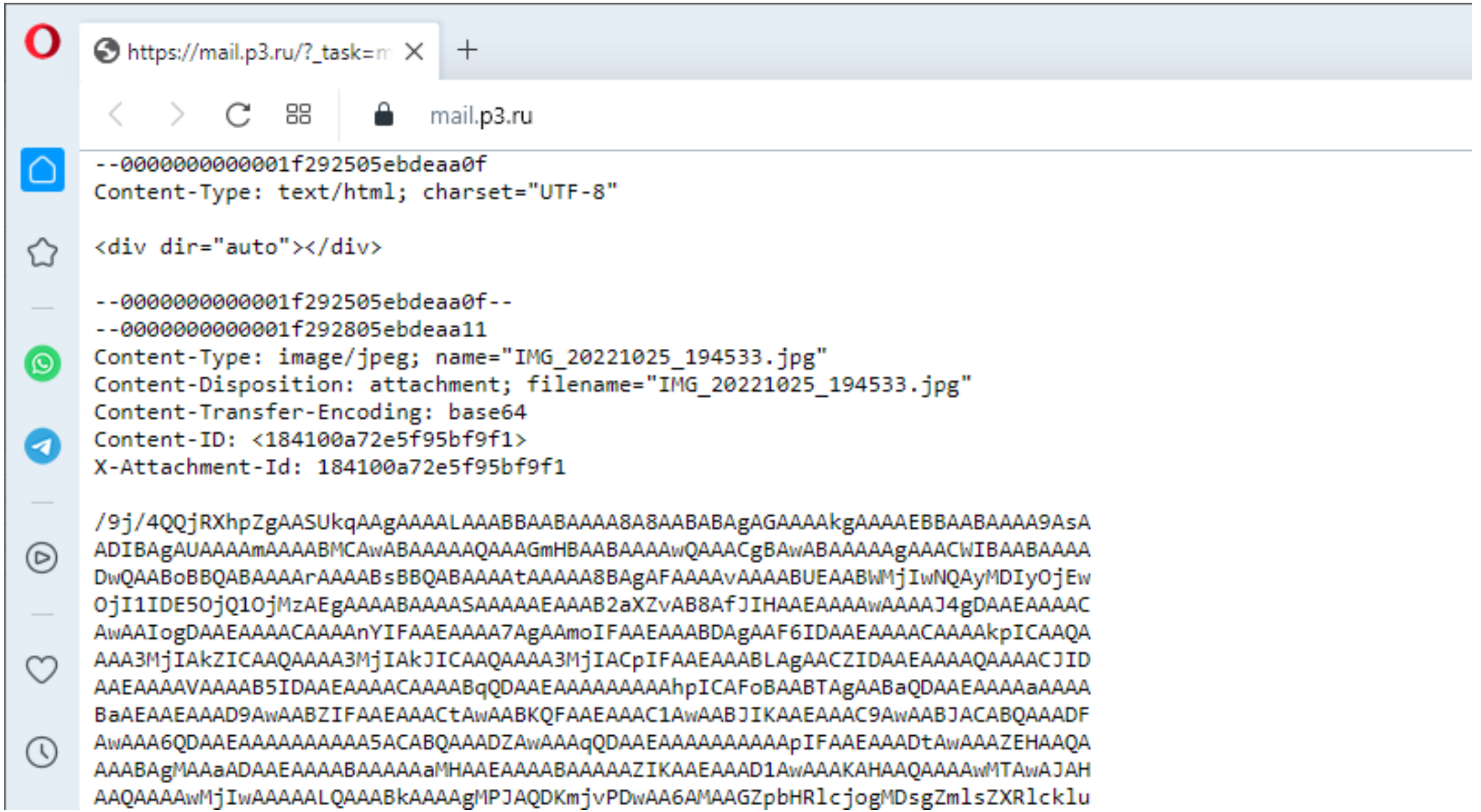


RTF и разметка текста (2)

```
{\rtf1
{\pict\jpegblip
0100090000037ca50100000066a501000000050000000b020
000000050000000c029a158e2366
a50100430f2000cc000000d10058010000000009a158e23000
0000028000000058010000d1000000
0100180000000000884a0300c40e0000c40e000000000000000
0000003662813561803763823e6a
89416d8c406c8b426e8d4571903f6c8d3c698a376485406d8
e507d9e4e7b9c4b78995481a25280
9f52809f507e9d4e7c9b4c7a994d7b9a517f9e5482a151809
c507e9d4d7b9a4b78994a77984d7a
9c527fa15783a85585a95686aa5686aa5585a95383a75282a
65282a65383a75d8bad5a88aa5a88
```



Передача бинарных данных по текстовым каналам: POP3 и SMTP




```
--0000000000001f292505ebdeaa0f
Content-Type: text/html; charset="UTF-8"

<div dir="auto"></div>

--0000000000001f292505ebdeaa0f--
--0000000000001f292805ebdeaa11
Content-Type: image/jpeg; name="IMG_20221025_194533.jpg"
Content-Disposition: attachment; filename="IMG_20221025_194533.jpg"
Content-Transfer-Encoding: base64
Content-ID: <184100a72e5f95bf9f1>
X-Attachment-Id: 184100a72e5f95bf9f1

/9j/4QQjRXhpZgAASUkqAAgAAAALAAABBAABAAAA8A8AABABAgAGAAAAkgAAAAEBBAABAAAA9AsA
ADIBAgAUAAAAmAAAABMCAwABAAAAAQAAAGmHBAABAAAAwQAAACgBAwABAAAAAgAAACWIBAABAAAA
DwQAABoBBQABAAAArAAAABsBBQABAAAAtAAAAA8BAgAFAAAAvAAAABUEAABlWMjIwNQAyMDIyOjEw
OjI1IDE5OjQ1OjMzAEgAAAABAAAASAAAAAEAAAB2aXZvAB8AfJIHAAEAAAAwAAAAJ4gDAAEAAAAC
AwAAIogDAAEAAAACAAAAnYIFAAEAAAA7AgAAmoIFAAEAAABDAgAAF6IDAAEAAAACAAAAkpICAAQA
AAA3MjIAkZICAAQAAAA3MjIAkJICAAQAAAA3MjIACpIFAAEAAABLAgAACZIDAAEAAAAQAAAACJID
AAEAAAAVAAAAB5IDAAEAAAACAAAABqQDAAEAAAAAAAAAhpICAFoBAABTAgAABaQDAAEAAAAaAAAA
BaAEAAEAAAD9AwAABZIFAAEAAACtAwAABKQFAAEAAAC1AwAABJIKAAEAAAC9AwAABJACABQAAADF
AwAAA6QDAAEAAAAAAAAAA5ACABQAAADZAwAAAqQDAAEAAAAAAAAApIFAAEAAADtAwAAAZEHAAQA
AAABAgMAAaADAAEAAAABAAAAAaMHAAEAAAABAAAAAZIKAAEAAAD1AwAAAKAHAAQAAAAwMTAwAJAH
AAQAAAAwMjIwAAAAALQAAABkAAAAgMPJAQDKmjvPDwAA6AMAAGZpbHRlcjogMDsgZmlsZXRlcklu
```

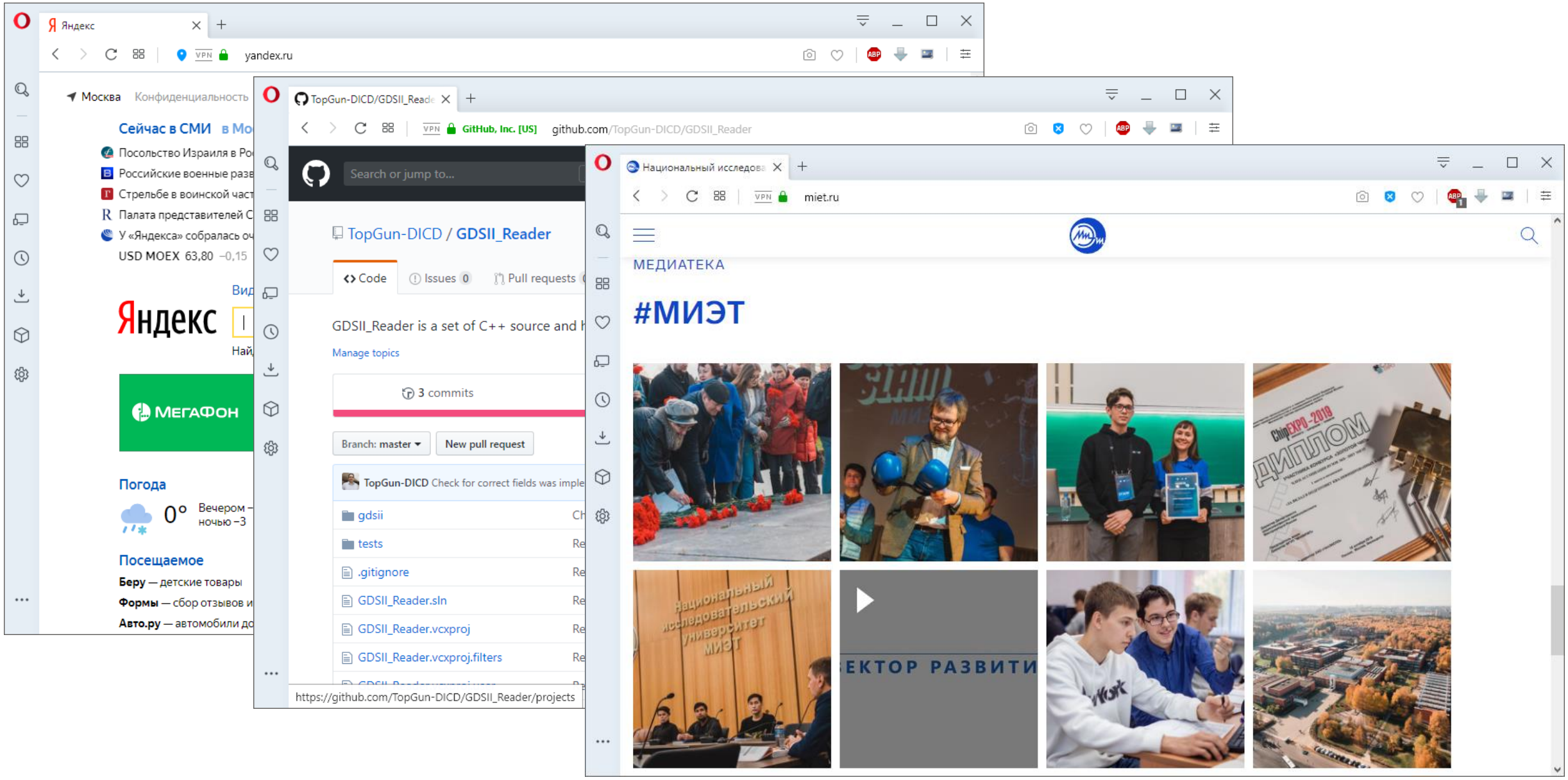
Алгоритм кодирования Base64 (1)

Алгоритм кодирования:

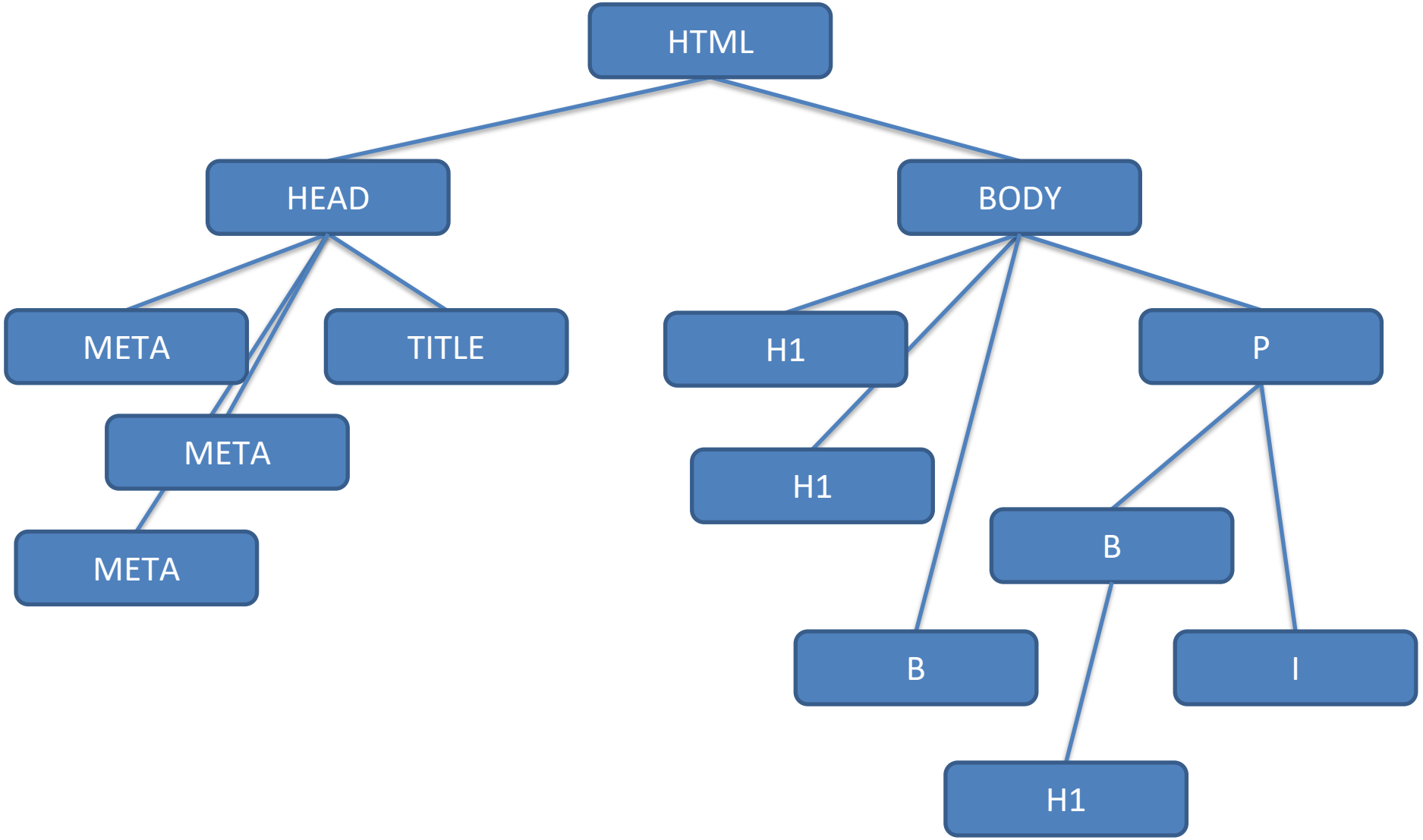
1. все символы, которые необходимо кодировать, выписываются в двоичном виде группами по 3 байта, в итоге получаются цепочки из 24 бит;
2. если для триплета байт не хватает байт, в недостающие позиции битов дописываются нули;
3. цепочка из 24 бит кодируется согласно таблице:

Символ	Значение				Символ	Значение				Символ	Значение				Символ	Значение			
	10	2	8	16		10	2	8	16		10	2	8	16		10	2	8	16
A	0	000000	00	00	Q	16	010000	20	10	g	32	100000	40	20	w	48	110000	60	30
B	1	000001	01	01	R	17	010001	21	11	h	33	100001	41	21	x	49	110001	61	31
C	2	000010	02	02	S	18	010010	22	12	i	34	100010	42	22	y	50	110010	62	32
D	3	000011	03	03	T	19	010011	23	13	j	35	100011	43	23	z	51	110011	63	33
E	4	000100	04	04	U	20	010100	24	14	k	36	100100	44	24	0	52	110100	64	34
F	5	000101	05	05	V	21	010101	25	15	l	37	100101	45	25	1	53	110101	65	35
G	6	000110	06	06	W	22	010110	26	16	m	38	100110	46	26	2	54	110110	66	36
H	7	000111	07	07	X	23	010111	27	17	n	39	100111	47	27	3	55	110111	67	37
I	8	001000	10	08	Y	24	011000	30	18	o	40	101000	50	28	4	56	111000	70	38
J	9	001001	11	09	Z	25	011001	31	19	p	41	101001	51	29	5	57	111001	71	39
K	10	001010	12	0A	a	26	011010	32	1A	q	42	101010	52	2A	6	58	111010	72	3A
L	11	001011	13	0B	b	27	011011	33	1B	r	43	101011	53	2B	7	59	111011	73	3B
M	12	001100	14	0C	c	28	011100	34	1C	s	44	101100	54	2C	8	60	111100	74	3C
N	13	001101	15	0D	d	29	011101	35	1D	t	45	101101	55	2D	9	61	111101	75	3D
O	14	001110	16	0E	e	30	011110	36	1E	u	46	101110	56	2E	+	62	111110	76	3E
P	15	001111	17	0F	f	31	011111	37	1F	v	47	101111	57	2F	/	63	111111	77	3F

Формат HTML


Яндекс
yandex.ru
Москва
Конфиденциальность
Сейчас в СМИ
Посольство Израиля в Ро
Российские военные разв
Стрельбе в воинской част
Палата представителей С
У «Яндекса» собралась оч
USD MOEX 63,80 −0,15
Яндекс
МегаФон
Погода
0°
Вечером −
ночью −3
Посещаемое
Беру — детские товары
Формы — сбор отзывов и
Авто.ру — автомобили до
TopGun-DICD/GDSII_Reade
github.com/TopGun-DICD/GDSII_Reader
GitHub, Inc. [US]
Search or jump to...
TopGun-DICD / GDSII_Reader
Code
Issues 0
Pull requests
GDSII_Reader is a set of C++ source and h
Manage topics
3 commits
Branch: master
New pull request
TopGun-DICD Check for correct fields was imple
gdsii
tests
.gitignore
GDSII_Reader.sln
GDSII_Reader.vcxproj
GDSII_Reader.vcxproj.filters
https://github.com/TopGun-DICD/GDSII_Reader/projects
Национальный исследова
miet.ru
МЕДИАТЕКА
#МИЭТ
ChipEXPO-2019
ДИПЛОМ
Национальный исследовательский университет МИЭТ

Document Object Model



HTML: структура заголовка

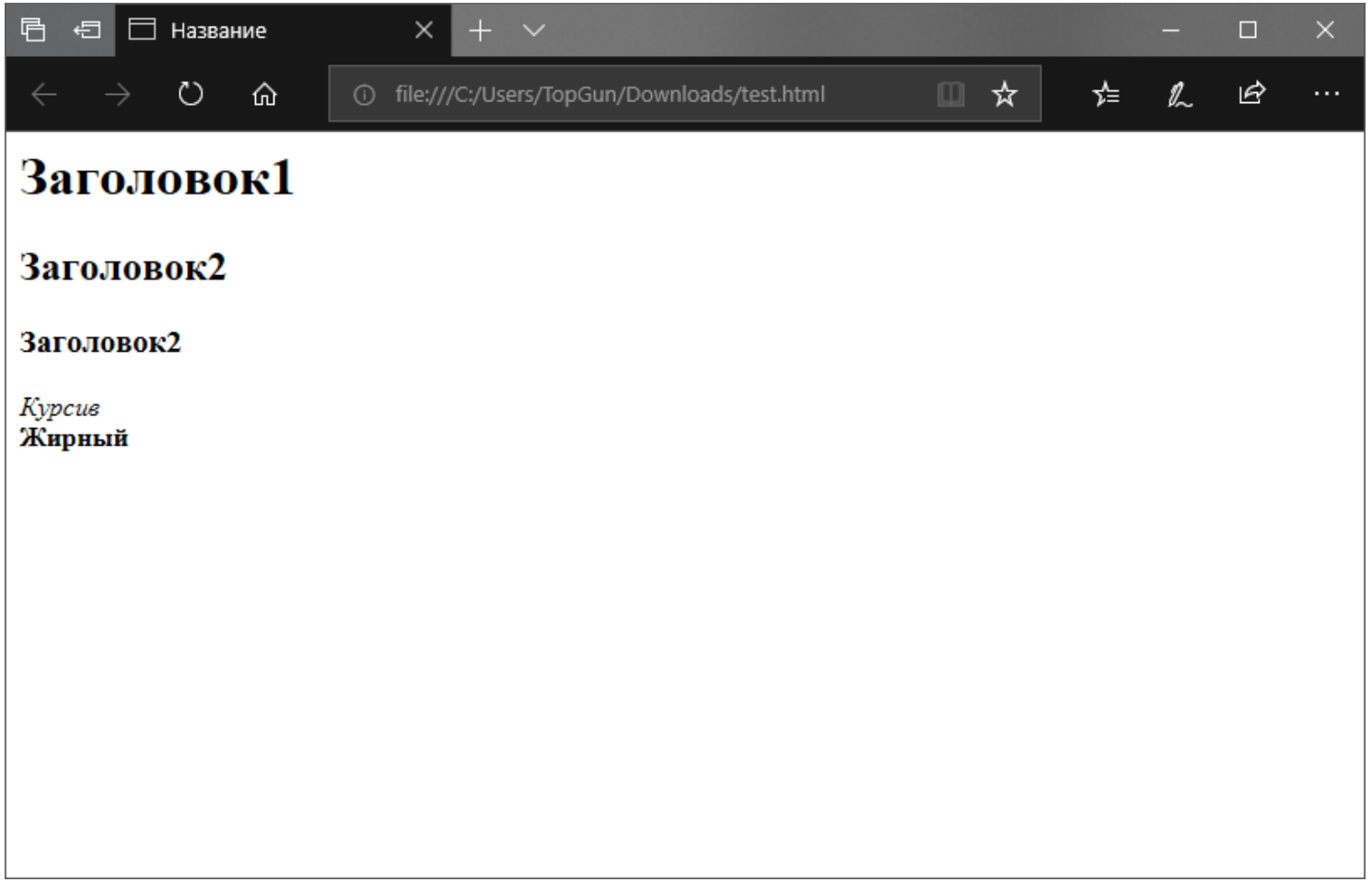
```
<head>
    <!-- Служебная информация о документе -->
    <meta charset="UTF-8">

    <meta name="keywords" lang="ru" content="МИЭТ,ПКИМС,магистратура,САПР">
    <meta name="description" lang="ru" content="Лаба №7 по курсу ИЯП">

    <meta name="viewport" content="width=device-width, initial-scale=1">

    <meta name="robots" content="noindex, nofollow">

    <meta http-equiv="refresh" content="30">

    <title>Главная страница</title>

    <style>...</style>
    <link>...</link>
    <script>...</script>
</head>
```

HTML: содержимое документа

```
<body>
    ..
    <div class="row"> <h2>Курсы осеннего семестра</h2> </div>
        <div class="row">
            <div class="col-md-4">
                <h4><a href="courses/2_ta/index.php">Теория алгоритмов</a></h4>
                <a href="courses/2_ta/index.php">
                    <img src="courses/2_ta/images/logo_ta.png"
                         class="img-responsive img-thumbnail"
                         alt="Теория алгоритмов">
                </a>
                <small>
                    <span class="pull-right">Группы ЭН-24, ЭН-25</span>
                </small>
            </div>
            <div class="col-md-4">
                <h4><a href="courses/3_ps_sapr/index.php">Программные средства САПР</a></h4>
                <a href="courses/3_ps_sapr/index.php">
                    <img src="courses/3_ps_sapr/images/logo_ps_sapr.png"
                         class="img-responsive img-thumbnail"
                         alt="Програмные средства САПР">
                </a>
                <small><span class="pull-right">Группы ЭН-34, ЭН-35</span></small>
            </div>
        </div>
    </div>
</body>
```

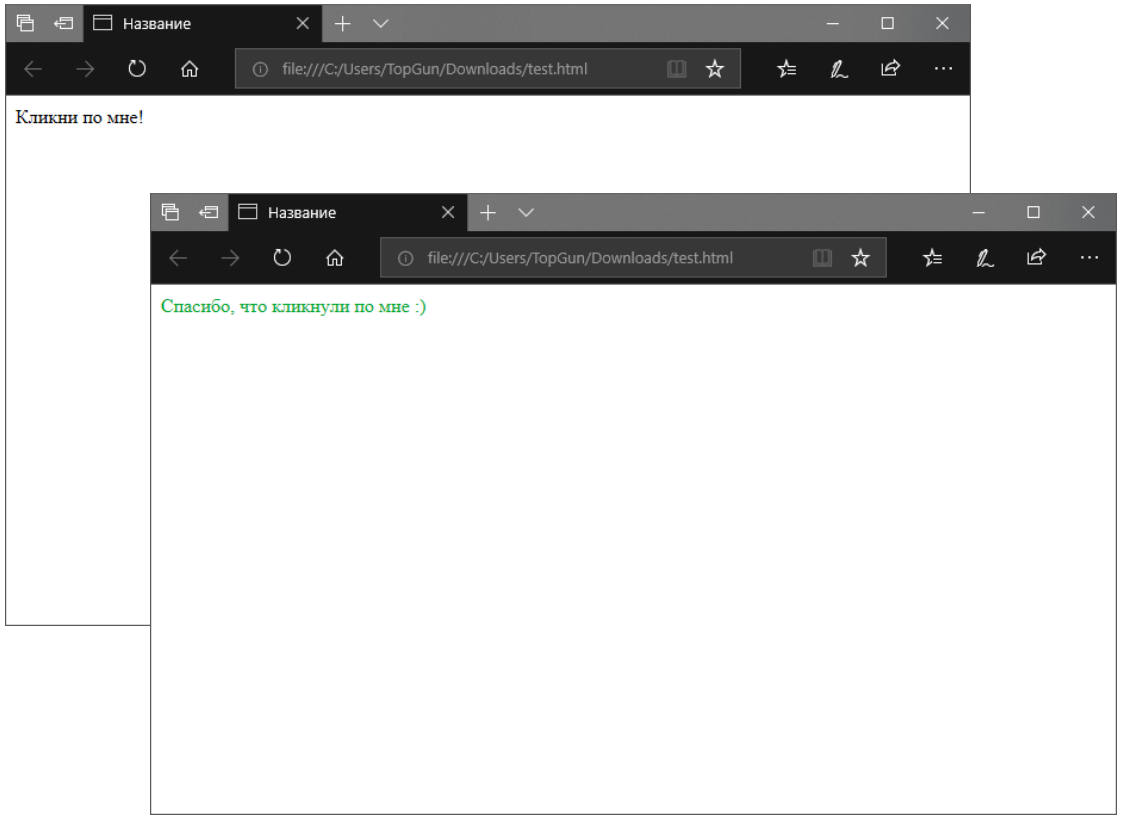
Примеры тегов HTML (1)

```
<html>

  <head>
    <title>Название</title>
  <head>

  <body>
    <h1>Заголовок1</h1>
    <h2>Заголовок2</h2>
    <h3>Заголовок2</h3>
        <p>
                <i>Курсив</i><br/>
                <b>Жирный</b>
        </p>
  </body>

</html>
```



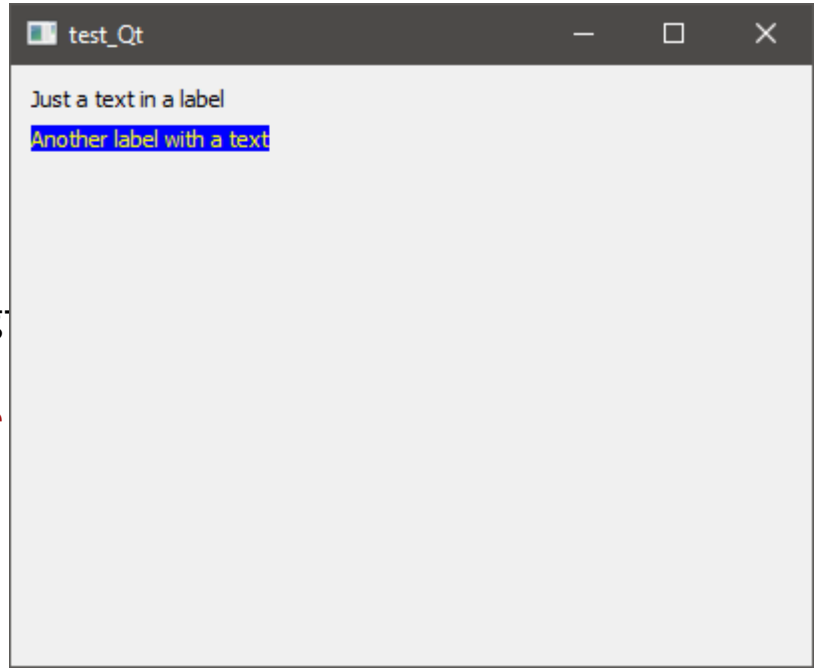
HTML: программирование на JavaScript

```
<html>

  <head>
    <title>Название</title>
    <link rel="stylesheet" href="styles.css">
  <head>

  <body>
    <p id="aaa" onclick="func()">Кликни по мне!</p>
  </body>

  <script lang="text/javascript">
    function func() {
          var item = document.getElementById("aaa");
          item.innerHTML = "Спасибо, что кликнули по мне :)";
          item.style.color = "#0a3";
        }
  </script>

</html>
```



Применение CSS в программировании на C++: QSS (2)

```
int main(int argc, char *argv[]) {
  QApplication app(argc, argv);


  QWidget *p_wgt = new QWidget(nullptr);
  p_wgt->resize(QSize(400, 300));
  p_wgt->show();

  QLabel *p_label = nullptr;

  p_label = new QLabel(QString("Just a text in a label"), p_wgt);
  p_label->move(QPoint(10, 10));
  p_label->show();

  p_label = new QLabel(QString("Another label with a text"), p_wgt
  p_label->move(QPoint(10, 30));
  p_label->setStyleSheet(QString("color: yellow; background-color
  p_label->show();

  return app.exec();
}
```



Хранение параметров и настроек программ: файлы INI (1)

config.ini

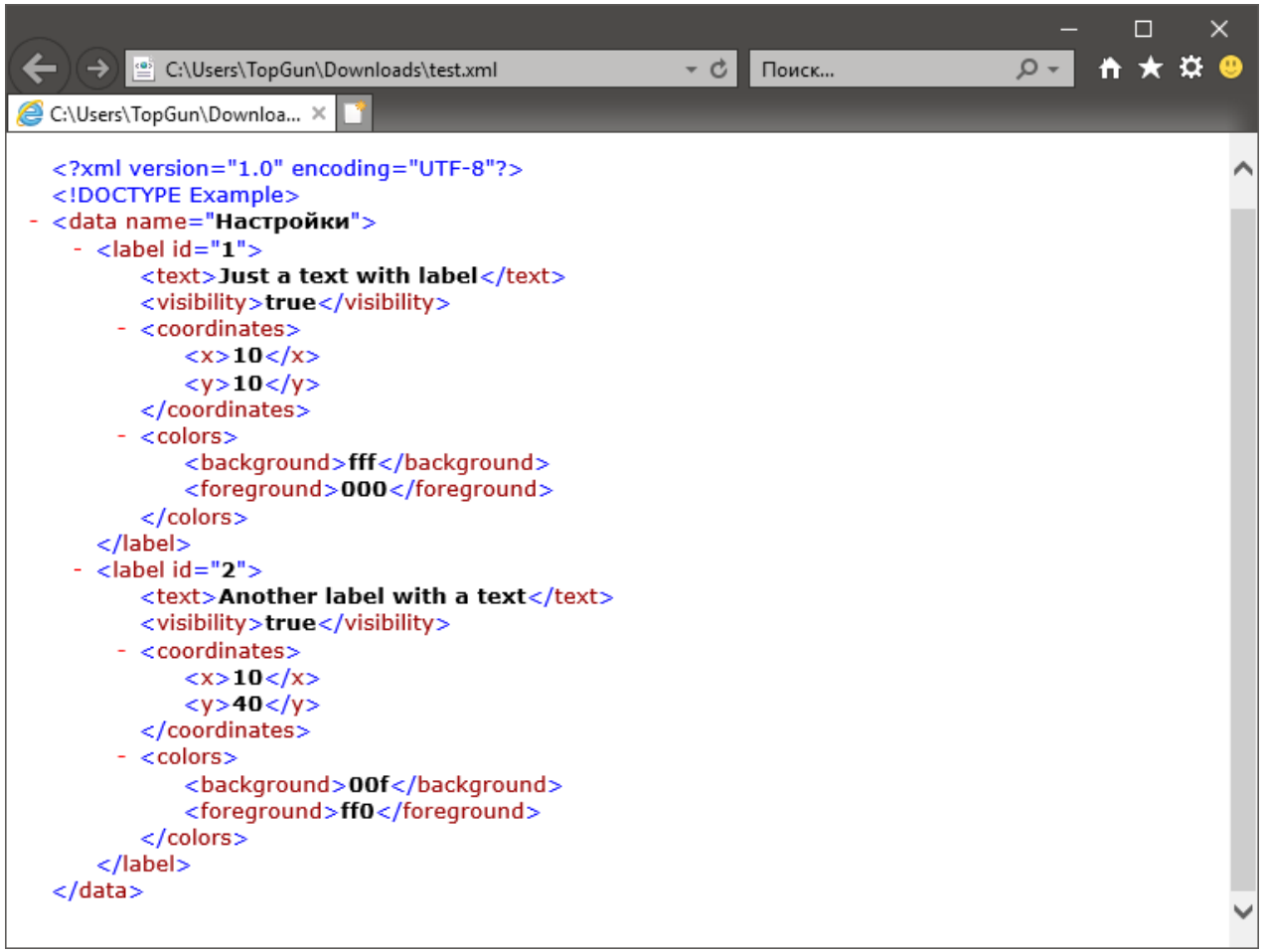
```
# файл настроек моей крутейшей проги
[Label1]
x=10
y=10
text=Just a text with label
bg=fff
fg=000
visible=1
[Label2]
x=10
y=40
text=Another label with a text
bg=00f
fg=ff0
visible=1
```

Хранение параметров и настроек программ: файлы INI (2)

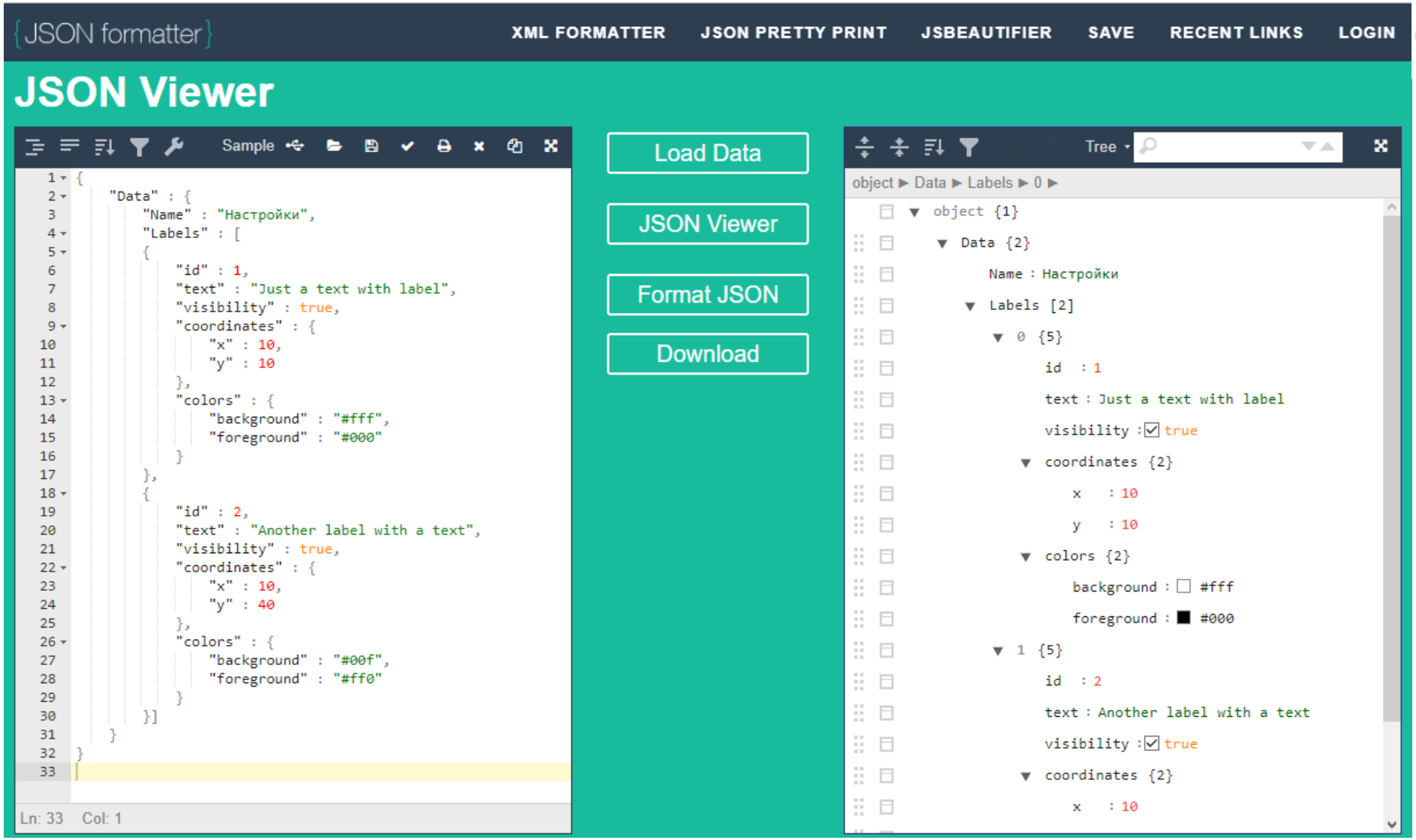
```
int main() {
  setlocale(LC_CTYPE, "rus");

  int x, y;
  char text[32], bg[4], fg[4];
  bool visible;

  CIniReader iniReader("config.ini");

  strcpy(text, iniReader.ReadString("Label1", "Text", "<Dummy text>"));
  x = iniReader.ReadInteger("Label1", "x", 10);
  y = iniReader.ReadInteger("Label1", "y", 10);
  strcpy(bg, iniReader.ReadString("Label1", "bg", "fff"));
  strcpy(fg, iniReader.ReadString("Label1", "fg", "000"));
  visible = iniReader.ReadBoolean("Label1", "visible", true);

  return 0;
}
```

Структуризация данных: формат XML

```xml
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE Example>
<data name="Настройки">
    <label id="1">
        <text>Just a text with label</text>
        <visibility>true</visibility>
        <coordinates>
            <x>10</x>
            <y>10</y>
        </coordinates>
        <colors>
            <background>fff</background>
            <foreground>000</foreground>
        </colors>
    </label>
</data>
```



Формат JSON


{JSON formatter}
XML FORMATTER
JSON PRETTY PRINT
JSBEAUTIFIER
SAVE
RECENT LINKS
LOGIN
JSON Viewer
Sample
Load Data
JSON Viewer
Format JSON
Download
Tree
object ▶ Data ▶ Labels ▶ 0 ▶
Ln: 33 Col: 1

JSON vs XML

C:\Users\Дмитрий Булах\KLayout\klayoutrc - Notepad++

File Edit Search View Encoding Language Settings Tools Macro Run Plugins
Window ?

klayoutrc

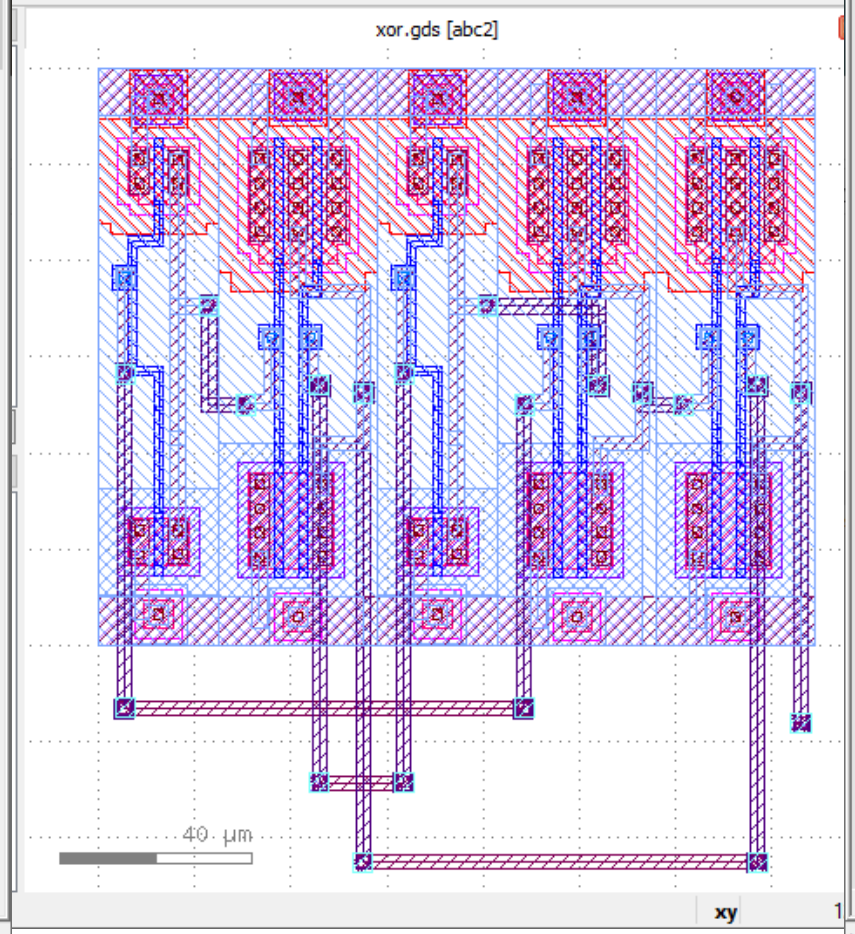
```
<?xml version="1.0" encoding="utf-8"?>
<config>
 <absolute-units>false</absolute-units>
 <abstract-mode-enabled>false</abstract-mode-enabled>
 <abstract-mode-width>10.0</abstract-mode-width>
 <apply-text-trans>true</apply-text-trans>
 <assistant-bookmarks/>
 <background-color>auto</background-color>
 <bitmap-caching>true</bitmap-caching>
 <bitmap-oversampling>1</bitmap-oversampling>
 <cell-list-sorting>by-name</cell-list-sorting>
 <child-context-color>auto</child-context-color>
 <child-context-dimming>50</child-context-dimming>
 <child-context-enabled>false</child-context-enabled>
 <child-context-hollow>false</child-context-hollow>
 <cib-context-cell/>
 <cib-context-mode>any-top</cib-context-mode>
 <cib-max-inst-count>1000</cib-max-inst-count>
 <cib-window-dim>1.0</cib-window-dim>
 <cib-window-mode>fit-marker</cib-window-mode>
 <cib-window-state/>
 <circle-points>32</circle-points>
 <clear-ruler-new-cell>false</clear-ruler-new-cell>
 <color-palette/>
 <combine-mode>add</combine-mode>
 <context-color>auto</context-color>
 <context-dimming>50</context-dimming>
 <context-hollow>false</context-hollow>
 <current-lib-view/>
 <current-ruler-template>0</current-ruler-template>
 <custom-macro-paths/>
 <dbu-units>false</dbu-units>
 <def-import-spec/>
 <default-add-other-layers>false</default-add-other-lay
 <default-font-size>0</default-font-size>
 <default-grids>0.01,0.005,0.001</default-grids>
```

Ln : 1 Col : 1 Pos : 1 | Unix (LF) | UTF-8 | INS

ds [abc2]

marks Display Tools Macros Help

Move Ruler (Default)



C:\Users\Дмитрий Булах\KLayout\klayoutrc.json - Notepad++

File Edit Search View Encoding Language Settings Tools Macro Run Plugins
Window ?

klayoutrc klayoutrc.json

```
{
  "config": {
    "absolute-units": false,
    "abstract-mode-enabled": false,
    "abstract-mode-width": 10.0,
    "apply-text-trans": true,
    "assistant-bookmarks": {
      "-self-closing": true
    },
    "background-color": "auto",
    "bitmap-caching": true,
    "bitmap-oversampling": 1,
    "cell-list-sorting": "by-name",
    "child-context-color": "auto",
    "child-context-dimming": 50,
    "child-context-enabled": false,
    "child-context-hollow": false,
    "cib-context-cell": {
      "-self-closing": true
    },
    "cib-context-mode": "any-top",
    "cib-max-inst-count": 1000,
    "cib-window-dim": 1.0,
    "cib-window-mode": "fit-marker",
    "cib-window-state": {
      "-self-closing": true
    },
    "circle-points": 32,
    "clear-ruler-new-cell": false,
    "color-palette": {
      "-self-closing": true
    },
    "combine-mode": "add",
    "context-color": "auto",
    "context-dimming": 50,
    "context-hollow": false,
    "current-lib-view": {
      "-self-closing": true
```

Ln : 35 Col : 26 Pos : 960 | Windows (CR LF) | UTF-8 | INS

JSON vs YAML

```
{
    "Design": {
        "Recent Files": [
            "examples/iscas85_Sky/iscas85_c499/results_sky/c499.gates.flat.synth.v",
            "examples/iscas85_Sky/iscas85_c499/c499.gates.flat.v",
            "examples/iscas85_Sky/iscas85_c880/c880.gates.flat.v",
            "examples/iscas85_Sky/iscas85_c880/results_sky/c880.gates.flat.synth.v",
            "examples/iscas85_Sky/iscas85_c1355/c1355.gates.flat.v",
            "examples/iscas85_Sky/iscas85_c1355/results_sky/c1355.gates.flat.synth.v",
            "examples/iscas85_Sky/iscas85_c1908/c1908.gates.flat.v",
            "examples/iscas85_Sky/iscas85_c1908/results_sky/c1908.gates.flat.synth.v",
            "examples/iscas85_Sky/iscas85_c2670/c2670.gates.flat.v",
            "examples/iscas85_Sky/iscas85_c3540/c3540.gates.flat.v",
            "examples/iscas85_Sky/iscas85_c5315/c5315.gates.flat.v",
            "examples/iscas85_Sky/iscas85_c6288/c6288.gates.flat.v",
            "examples/iscas85_Sky/iscas85_c7552/c7552.gates.flat.v",
            "examples/iscas85_Sky/iscas85_c432/results_sky/c432.gates.flat.synth.v",
            "examples/iscas85_Sky/iscas85_c17/c17.gates.flat.v",
            "examples/iscas85_Sky/iscas85_c432/micron/c432.mapped.v"
        ],
        "Recent Libraries": [
            "examples/iscas85_Sky/SkyWater130nm_PDK_libs/sky130_fd_sc_hd__blackbox.v",
            "examples/CORELIB8DLL_empty.v"
        ]
    },
    "Presets": [
    ]
}
```

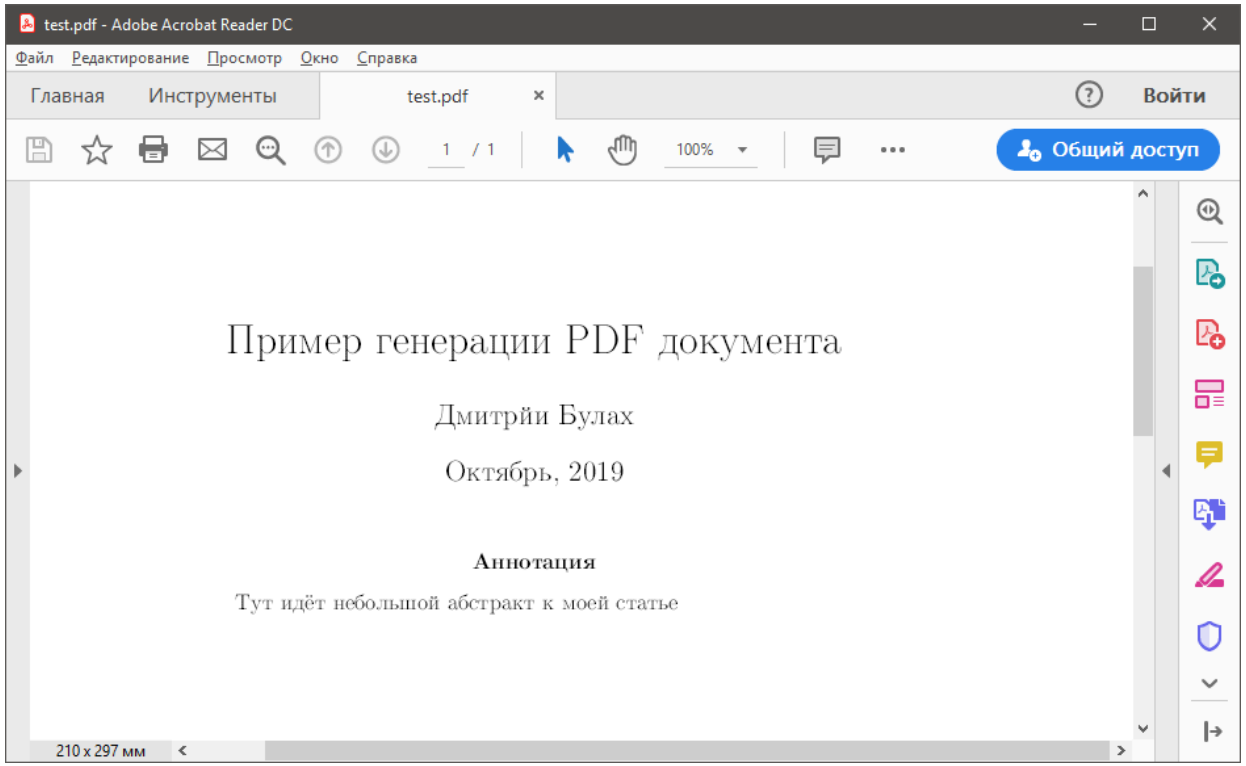

```
Design:
  Recent_Files:
    - examples/iscas85_Sky/iscas85_c499/results_sky/c499.gates.flat.synth.v
    - examples/iscas85_Sky/iscas85_c499/c499.gates.flat.v
    - examples/iscas85_Sky/iscas85_c880/c880.gates.flat.v
    - examples/iscas85_Sky/iscas85_c880/results_sky/c880.gates.flat.synth.v
    - examples/iscas85_Sky/iscas85_c1355/c1355.gates.flat.v
    - examples/iscas85_Sky/iscas85_c1355/results_sky/c1355.gates.flat.synth.v
    - examples/iscas85_Sky/iscas85_c1908/c1908.gates.flat.v
    - examples/iscas85_Sky/iscas85_c1908/results_sky/c1908.gates.flat.synth.v
    - examples/iscas85_Sky/iscas85_c2670/c2670.gates.flat.v
    - examples/iscas85_Sky/iscas85_c3540/c3540.gates.flat.v
    - examples/iscas85_Sky/iscas85_c5315/c5315.gates.flat.v
    - examples/iscas85_Sky/iscas85_c6288/c6288.gates.flat.v
    - examples/iscas85_Sky/iscas85_c7552/c7552.gates.flat.v
    - examples/iscas85_Sky/iscas85_c432/results_sky/c432.gates.flat.synth.v
    - examples/iscas85_Sky/iscas85_c17/c17.gates.flat.v
    - examples/iscas85_Sky/iscas85_c432/micron/c432.mapped.v
  Recent_Libraries:
    - examples/iscas85_Sky/SkyWater130nm_PDK_libs/sky130_fd_sc_hd__blackbox.v
    - examples/CORELIB8DLL_empty.v
  Presets:
```

LaTeX

```
% Статья в формате LaTeX
\documentclass{article}

\usepackage[utf8x]{inputenc}
\usepackage[russian]{babel}

\begin{document}

% Основной текст статьи
PDF, сгенерированный на основе \LaTeX{}

\end{document}
```

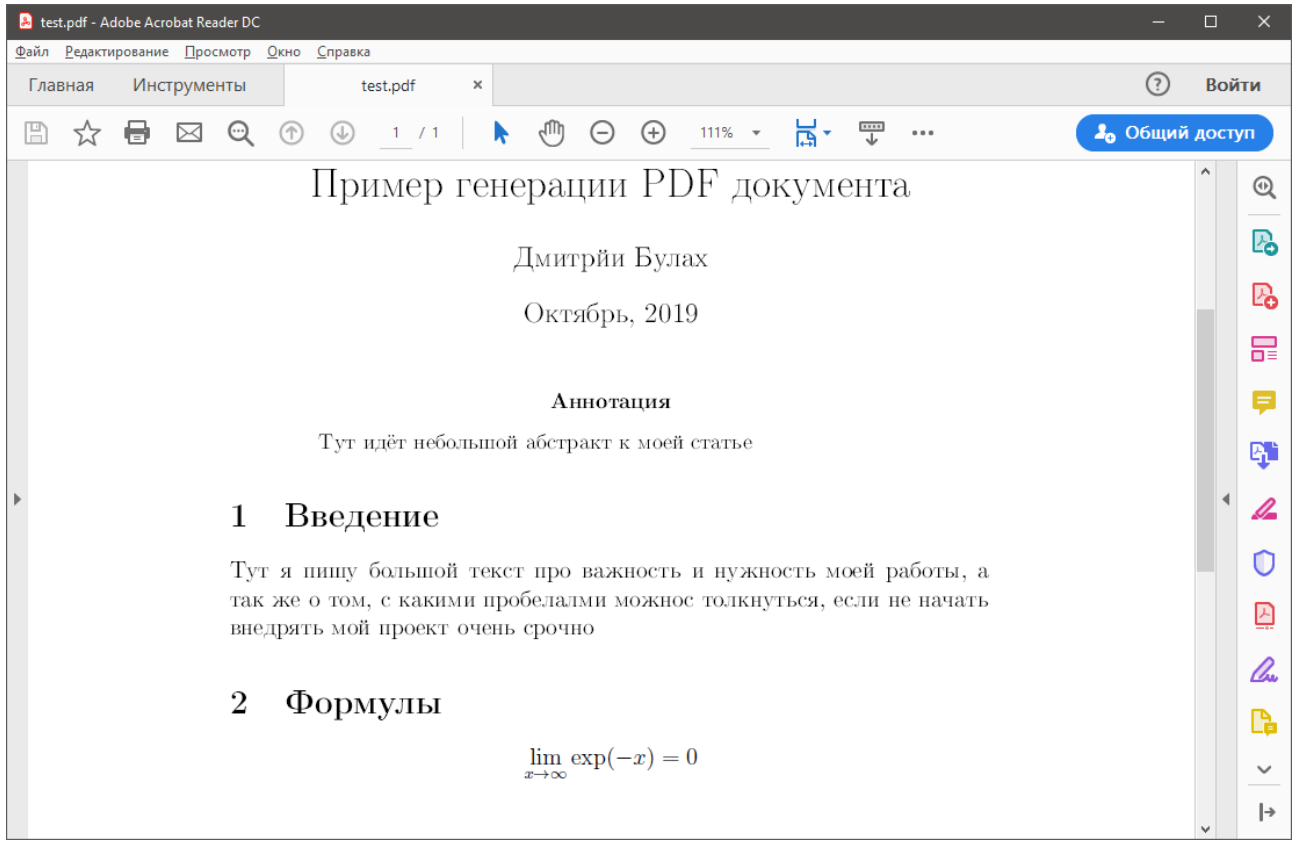
Написание документов LaTeX

```
\documentclass[a4paper,12pt]{article}
\usepackage[utf8]{inputenc}
\usepackage[english,russian]{babel}
\begin{document}
\title{Пример генерации PDF документа}
\author{Дмитрйи Булах}
\date{Октябрь, 2019}
\maketitle

\begin{abstract}
        Тут идёт небольшой абстракт к моей статье
\end{abstract}

\end{document}
```



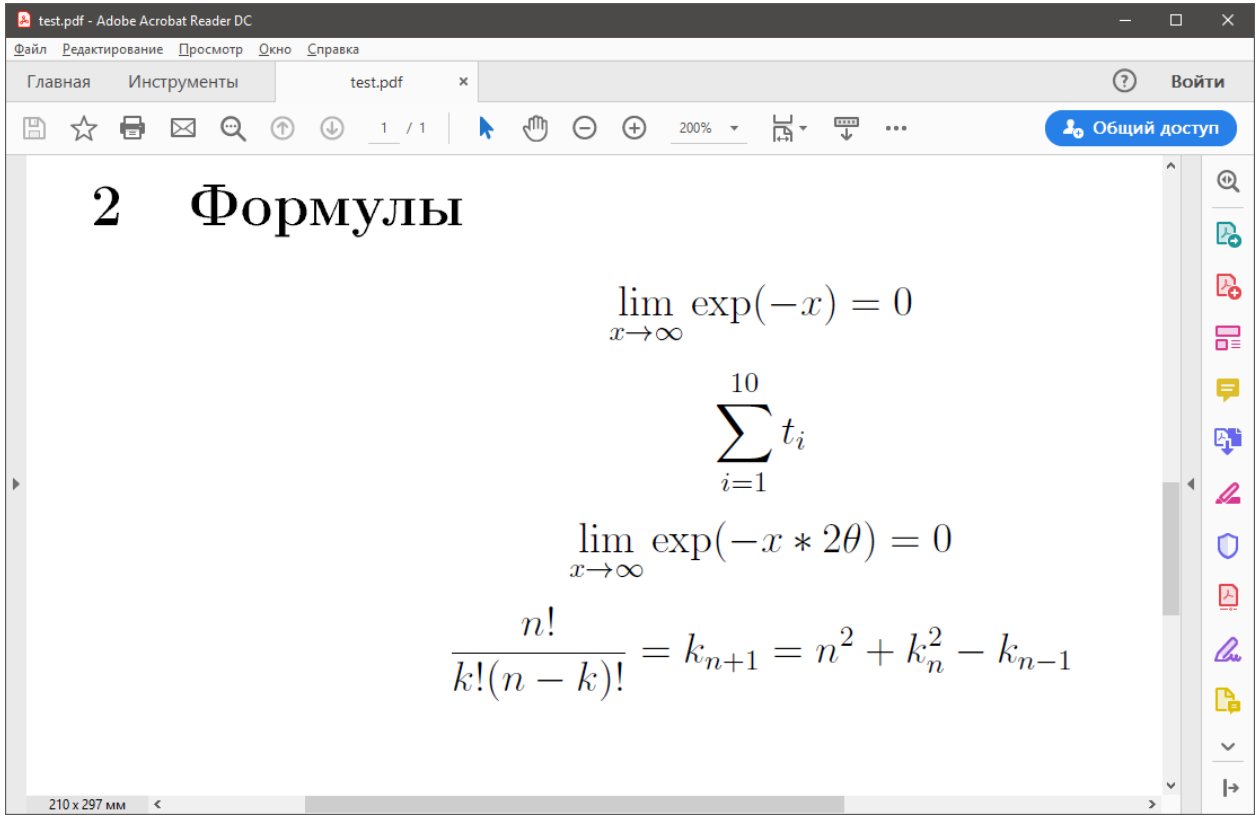
LaTeX: формулы (1)

```
\usepackage{amsmath}
\usepackage{mathtools}


\[ \lim\limits_{x \to \infty} \exp(-x) = 0 \]
```



LaTeX: формулы (2)

```
\usepackage{amsmath}
\usepackage{mathtools}
```



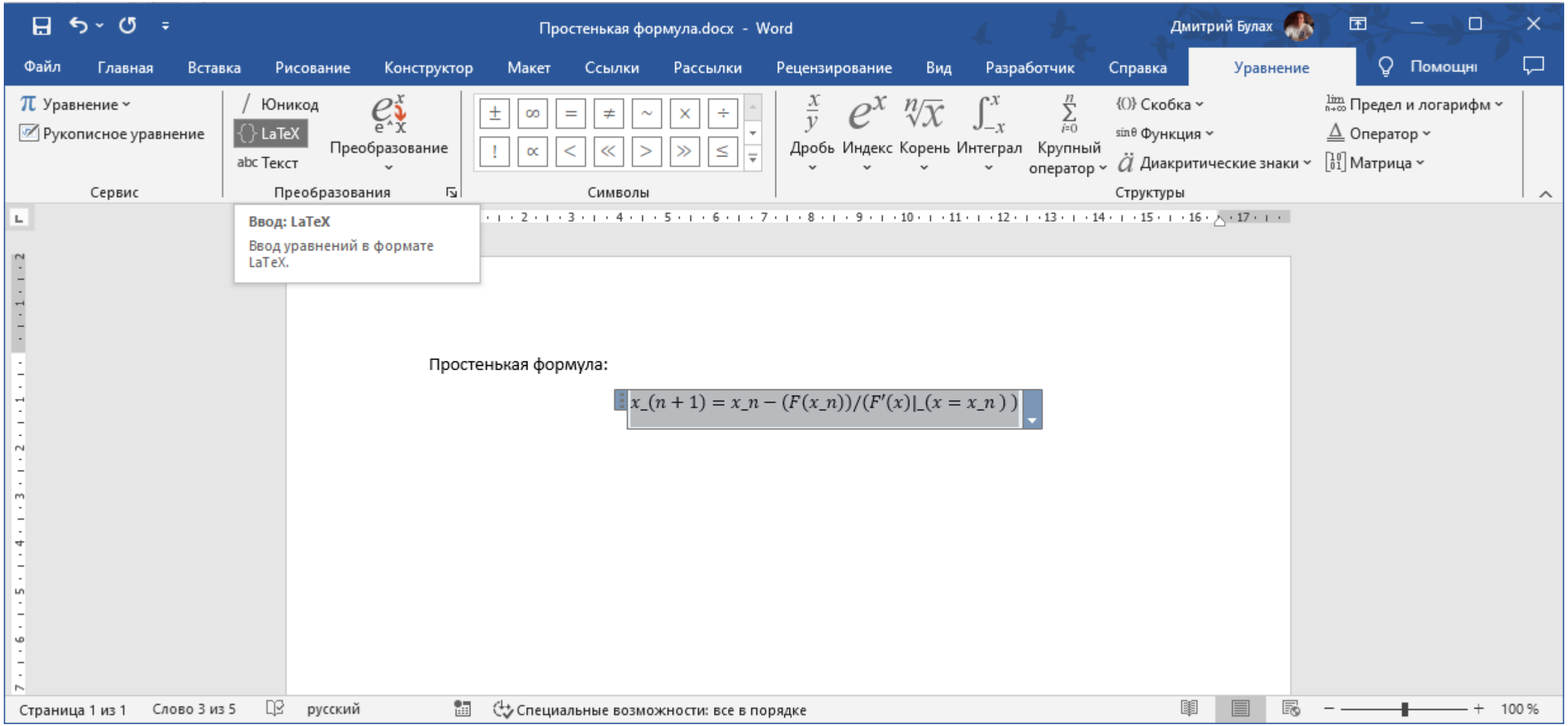

```
\[ \lim\limits_{x \to \infty} \exp(-x) =
```

```
\[ \sum_{i=1}^{10} t_i \]
```

```
\[ \lim\limits_{x \to \infty} \exp(-x*2\theta) = 0 \]
```

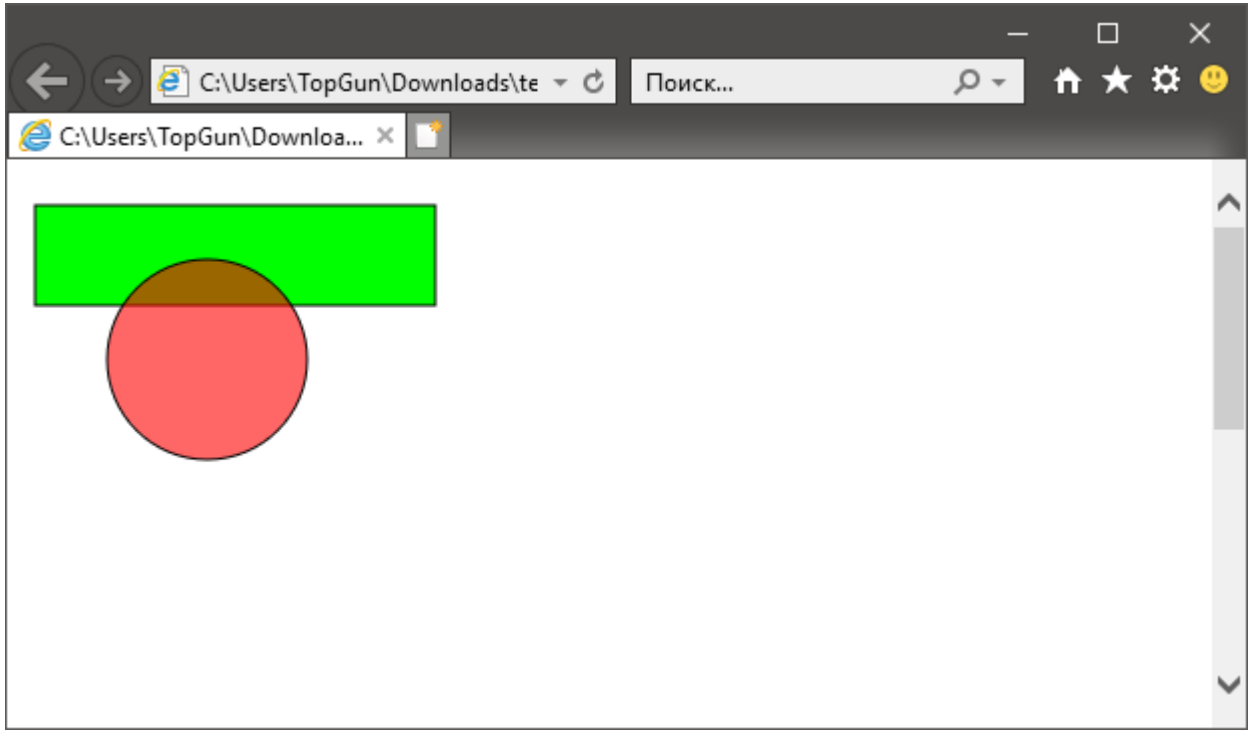
```
\[ \frac{n!}{k!(n-k)!} = k_{n+1} = n^2 + k_n^2 - k_{n-1} \]
```

LaTeX: формулы (3)



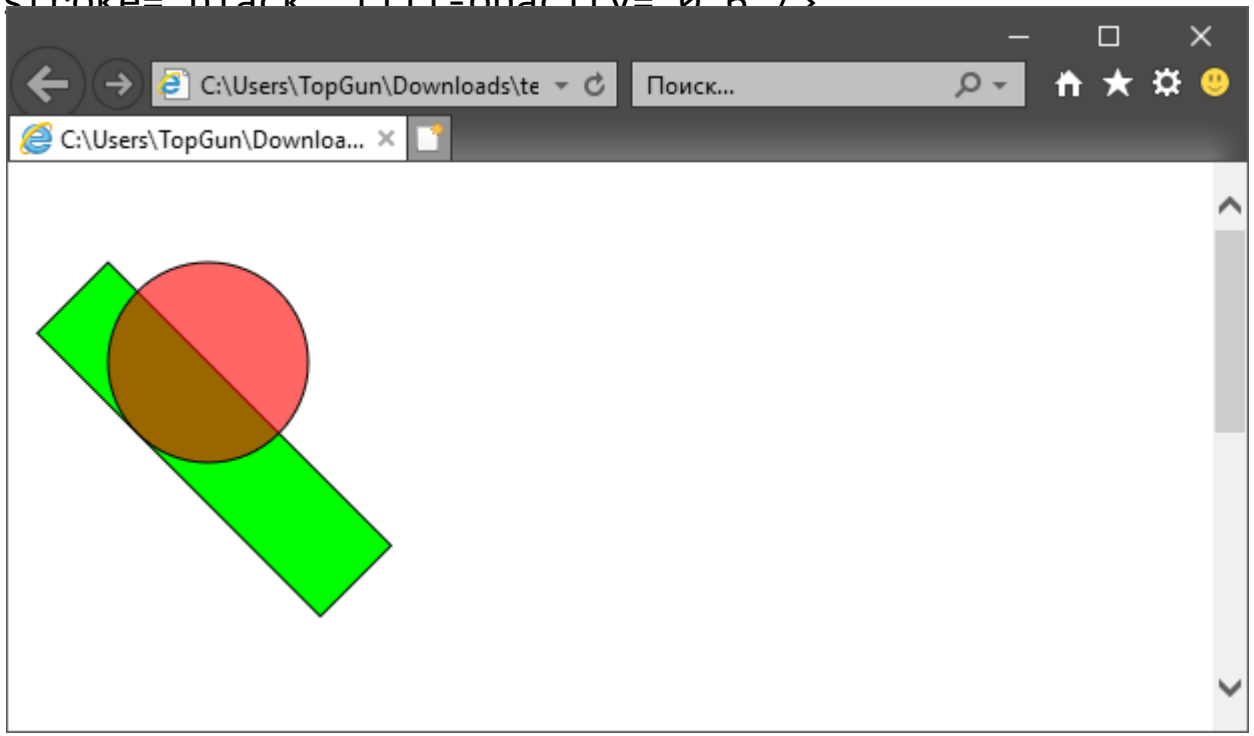
Формат SVG


```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE svg PUBLIC "-//W3C//DTD SVG 1.1//EN"
  "http://www.w3.org/Graphics/SVG/1.1/DTD/svg11.dtd">

<svg xmlns="http://www.w3.org/2000/svg" version="1.1" width="600" height="600">

  <rect x="14" y="23" width="200" height="50" fill="lime" stroke="black" />
  <circle cx="100" cy="100" r="50" fill="red" stroke="black" fill-opacity="0.6"/>

</svg>
```



Аффинные преобразования в SVG

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE svg PUBLIC "-//W3C//DTD SVG 1.1//EN"
  "http://www.w3.org/Graphics/SVG/1.1/DTD/svg11.dtd">

<svg xmlns="http://www.w3.org/2000/svg" version="1.1" width="600" height="600">

  <rect x="0" y="0" width="200" height="50" fill="lime" stroke="black"
        transform="translate(50,50) rotate(45)"/>
  <circle cx="100" cy="100" r="50" fill="red" stroke="black" fill-opacity="0.6"/>

</svg>
```



Хранение изображений: формат XPM (2)

C:\Users\Дмитрий Булах\Downloads\exit (1).xpm - Notepad++

Правка Поиск Вид Кодировки Синтаксисы Опции Инструменты Макросы
Плагины Вкладки ?

(1).xpm

```
/* XPM */
static char *exit (1)_xpm[] = {
/* width height num_colors chars_per_pixel */
"    32    32      256            2",
/* colors */
"`` c #ffffff",
"`. c #f2f2f2",
"`# c #b5b5b5",
"`a c #747474",
"`b c #34312f",
"`c c #252522",
"`d c #e9e9e9",
"`e c #dddddd",
"`f c #bababa",
"`g c #797979",
"`h c #373633",
"`i c #030303",
"`j c #070604",
"`k c #40341f",
"`l c #5b4925",
"`m c #000000",
"`n c #eaeaea",
"`o c #020202",
"`p c #050403",
"`q c #3b311d",
"`r c #7e6534",
"`s c #be994e",
"`t c #f7c766",
"`u c #ffcd69",
"`v c #bf9a4f",
```

length : Ln : 1 Col : 1 Pos : 1 | Unix (LF) | UTF-8 | INS

C:\Users\Дмитрий Булах\Downloads\exit (1).xpm - Notepad++

Файл Правка Поиск Вид Кодировки Синтаксисы Опции Инструменты Макросы
Запуск Плагины Вкладки ?

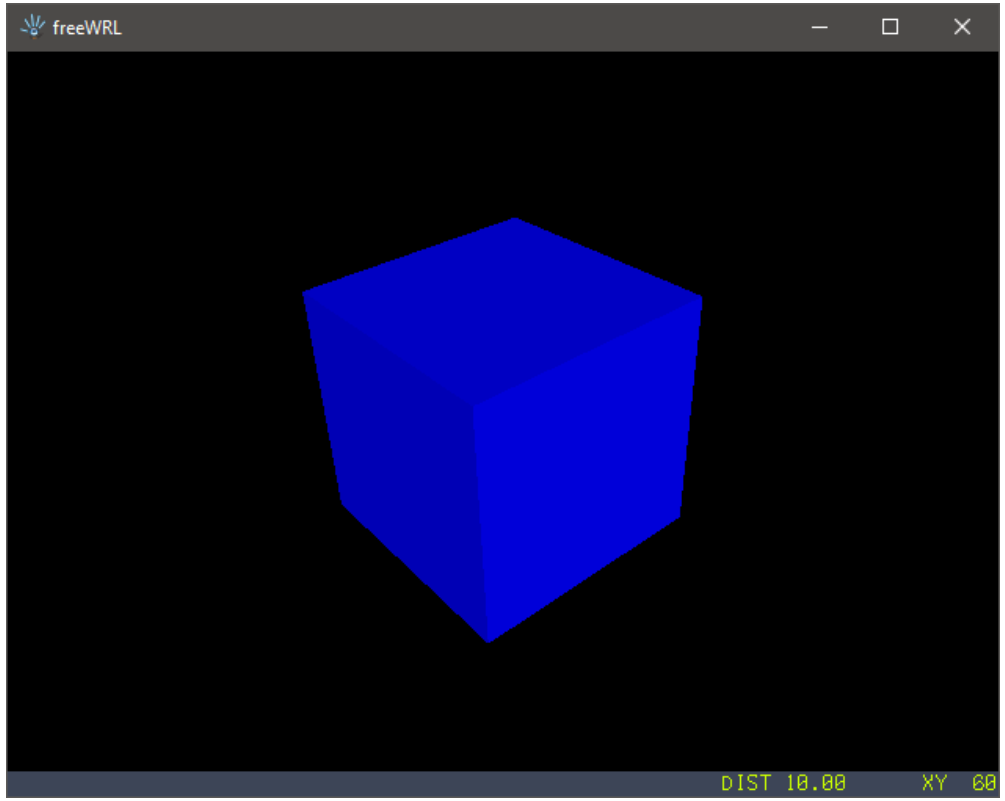
exit (1).xpm

```
261  "a8 c #000000",
262  /* pixels */
263  "``````````````````````````````````````````````````.`#`a`b
264  "````````````d`e`e`e`e`e`e`e`e`e`e`e`e`e`e`e`e`f`g`h`i`j`k`l
265  "``````````n`o`m`m`m`m`m`m`m`m`m`m`m`m`m`m`m`m`p`q`r`s`t`u`v
266  "``````````w`m`x`e`e`e`e`e`e`e`e`e`e`e`e`e`e`e`y`z`u`u`u`u`u`v
267  "`A`B`B`B`B`C`m`C`B`B`B`B`B`B`B`B`B`B`B`B`B`D```E`z`u`u`u`u`u`v
268  "`F`G`H`H`H`H`I`J`J`J`J`J`J`J`J`J`J`J`J`K`L```E`z`u`u`u`u`u`v
269  "`m`M`N`N`N`N`N`N`N`N`N`N`N`N`N`N`N`N`N`O`P```E`z`u`u`u`u`u`v
270  "`m`M`Q`R`R`S`N`T`U`N`V`W`X`Y`Z`0`R`R`1`2`O`P```E`z`u`u`u`u`u`v
271  "`m`M`3`4`5`2`N`6`7`8.``2..`m.#.a.b.c`Q`Z`O`P```E`z`u`u`u`u`u`v
272  "`m`M`3`4`5.d`N.e.f`m.g`N..`m.#`N.h.``N`N`O`P```E`z`u`u`u`u`u`v
273  "`m`M`3.i`R.j`N.k.l`m.m`N..`m.#`N.h.``N`N`O`P```E`z`u`u`u`u`u`v
274  "`m`M`3.n`N`N`N.o.p.q.r.s..`m.#`N.h.``N`N`O`P```E`z`u`u`u`u`u`v
275  "`m`M.t.`.u.v.w.i.x`N.y.z.a`m.A`N`M.i`N`N`O`P```E`z`u`u`u`u`u`v
276  "`m`M.B.C.D.E`N.F`N`N.G.H`N.I`N`N.J.K`N`N`O`P``.L.M`u`u`u`u`u`v
277  "`m.N`5`5`5`5`5`5`5`5`5`5`5`5`5`5`5`5`5`5`5.O`P````u`u`u`u`u`v
278  ".P.Q.Q.Q.Q.R`m.S.T.T.T.T.T.T.T.T.T.T.T.T.T.U```f.V`u`u`u`u`u`v
279  "``````````w`m`w``````````````````````````````.W.X`u`u`u`u`u`v
280  "``````````w`m`w``````````````````````````````````u`u`u`u`u`v
281  "``````````w`m`w````.Y`````````````````````````.Z.0`u`u`u`u`u`v
282  "``````````w`m`w``.1`F.2.3`````````````````````E`z`u`u`u`u`u`v
283  "``.4.5.6.6.7`m.7.8#``m#.`o##`d```````````````````E`z`u`u`u`u`u`v
284  "``#a#b#c#c#c#c#c#c#d#e#f#g#h#i#j````````````````E`z`u`u`u`u`u`v
285  "``#a#k#l#l#l#l#l#l#l#l#l#m#n`m#o````````````````E`z`u`u`u`u`u`v
286  "``#a#p#q#q#q#q#q#q#q#r#s#t#u#v#w.1````````````````E`z`u`u`u`u`u`v
287  "``#x#y#z#z#A`m#B#C#D`m#E#F#G#H`````````````````E`z`u`u`u`u`u`v
288  "``````````w`m`w``#I`m#J#K`````````````````````E`z`u`u`u`u`u`v
289  "``````````w`m`w````D#j`````````````````````````E`z`u`u`u`u`u`v
290  "``````````w`m`w````````````````````````````````E`z`u`u`u`u`u`v
```

length : Ln : 1 Col : 1 Pos : 1 | Unix (LF) | UTF-8 | INS

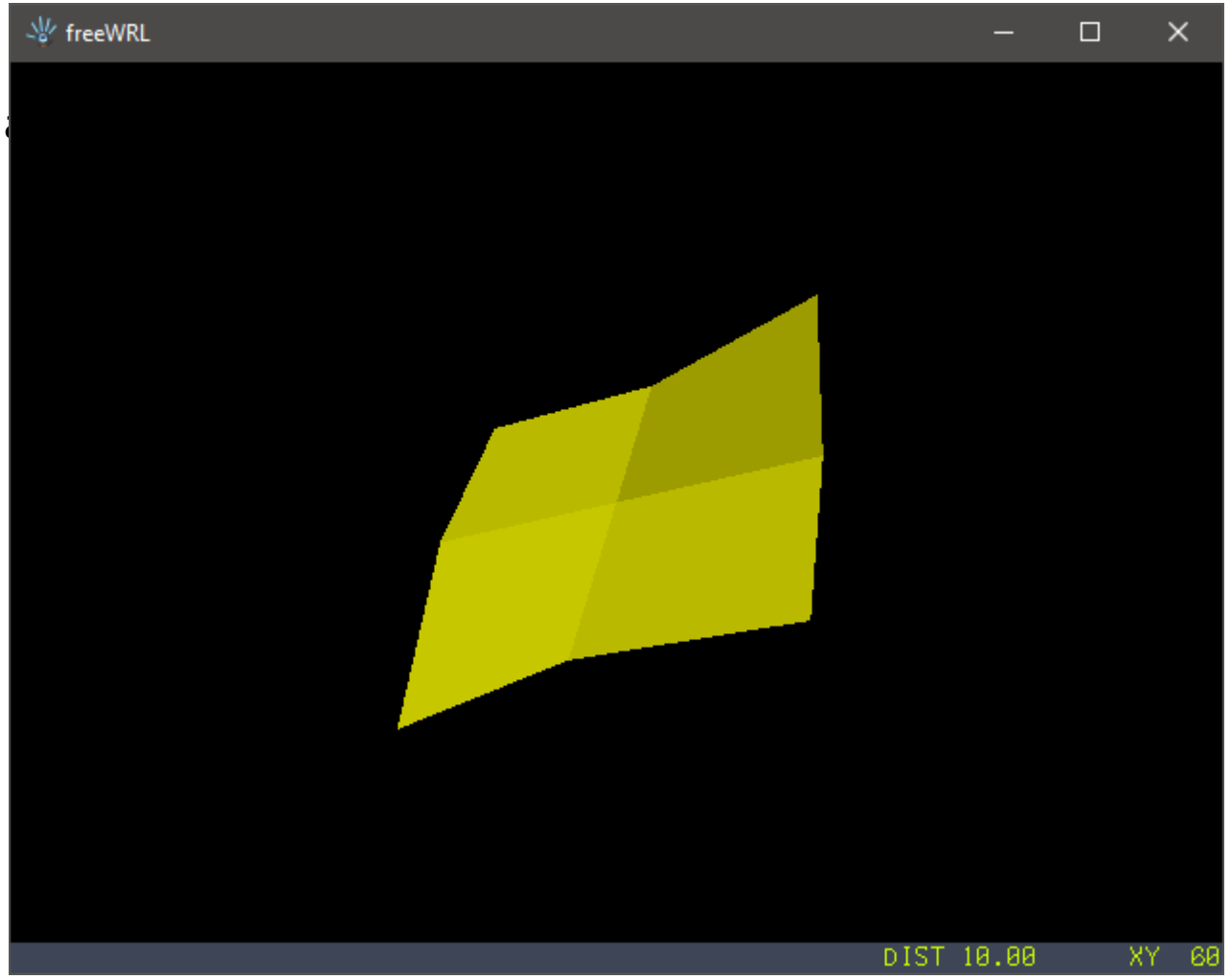
Формат VRML (1)


```
#VRML V2.0 utf8
Shape {
    geometry Box {
        size 2 2 2
    }
    appearance Appearance {
        material Material {
            diffuseColor 0 0 1
        }
    }
}
```



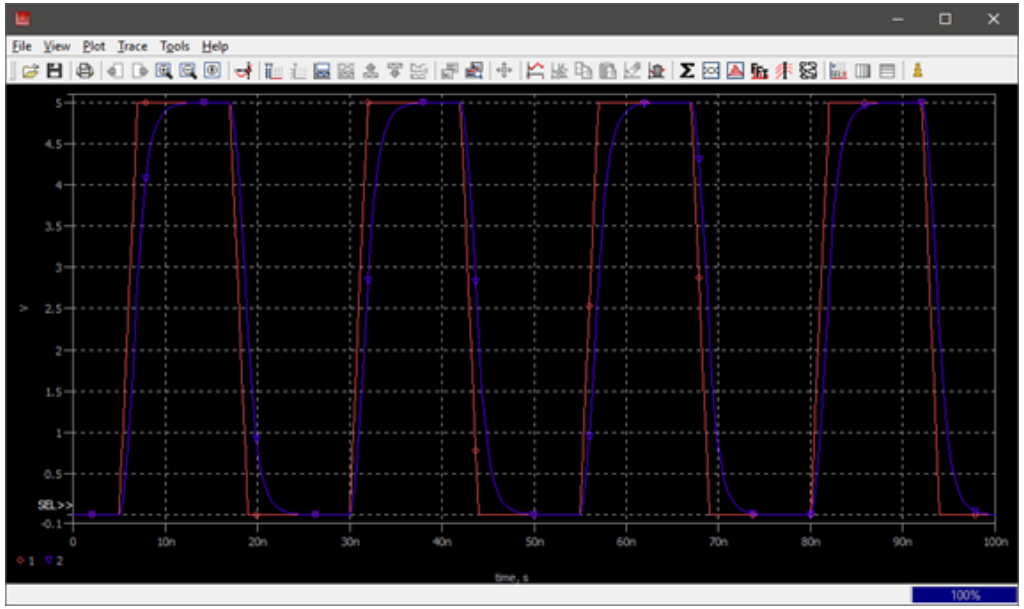
Формат VRML: научная визуализация (1)

```
Transform {
  scale 2 2 1
  children [
    Shape {
      appearance Appearance {material Materi
      geometry IndexedFaceSet {
        coord Coordinate {
          point [
            -1, +1, 0,
             0, +1, 0,
             ...
          ]
        }
        coordIndex [
          0, 3, 4, 1, -1,
          1, 4, 5, 2, -1,
          3, 6, 7, 4, -1,
          4, 7, 8, 5, -1
        ]
        ...
```

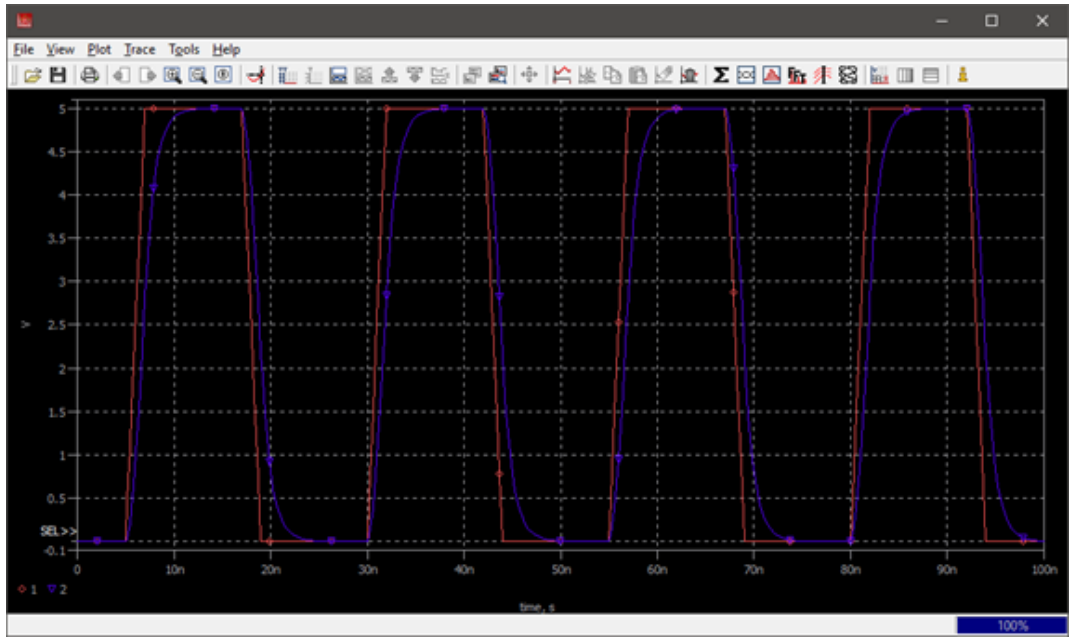


Текстовые данные в САПР (1)

```
HEADER
"PSFversion" "1.00"
"simulator" "HSPICE"
"runtype" "Transient Analysis"
TYPE
"node" FLOAT DOUBLE PROP(
"key" "node"
)
"branch" FLOAT DOUBLE PROP(
"key" "branch"
)
"sweep" FLOAT DOUBLE
SWEEP
"time" "sweep"
TRACE
"group" GROUP 2
"1" "node"
"2" "node"
VALUE
"time" 0.000000e+00
"group"
0.000000e+00
0.000000e+00
"time" 1.000000e-09
"group"
0.000000e+00
0.000000e+00
```

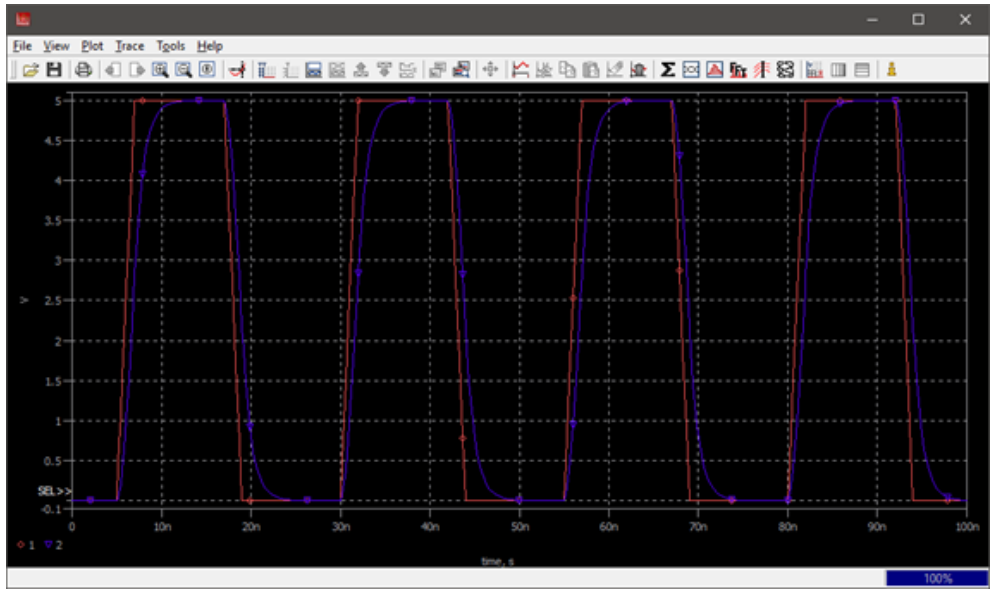


Текстовые данные в САПР (2)



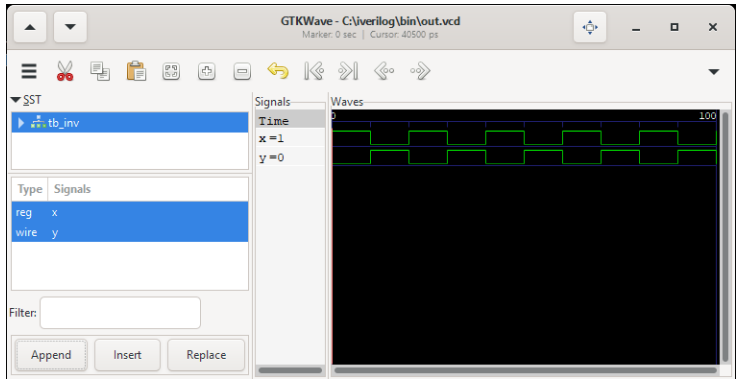

```
; Additional parameters:
; Temperature (TEMP) =   2.50000000e+001
; Temperature (TNOM) =   2.50000000e+001
; Local inaccuracy =   9.99999700e-003
; reltol =   1.00000000e-003
; Acceleration level = without acceleration

TIME      'v(1)'      'v(2)'
0.00000000e+000  0.00000000e+000  0.00000000e+000
2.00000000e-009  0.00000000e+000  0.00000000e+000
5.00000000e-009  0.00000000e+000  0.00000000e+000
5.02386518e-009  5.96629438e-002  1.39067797e-003
5.07159553e-009  1.78988831e-001  6.88855948e-003
5.12889016e-009  3.22225398e-001  2.04634393e-002
5.18236485e-009  4.55912118e-001  3.96611966e-002
5.28931422e-009  7.23285558e-001  9.54911926e-002
5.42992725e-009  1.07481814e+000  2.01060109e-001
5.60837057e-009  1.52092642e+000  3.80746951e-001
5.81707047e-009  2.04267617e+000  6.45518006e-001
6.06470662e-009  2.66176655e+000  1.02159440e+000
6.35438100e-009  3.38595250e+000  1.52822094e+000
6.69637078e-009  4.24092695e+000  2.19562050e+000
7.00000000e-009  5.00000000e+000  2.83483203e+000
7.14454208e-009  5.00000000e+000  3.10826704e+000
7.38134698e-009  5.00000000e+000  3.50881305e+000
7.85495678e-009  5.00000000e+000  4.07983339e+000
8.25644207e-009  5.00000000e+000  4.38750412e+000
8.67525042e-009  5.00000000e+000  4.59960723e+000
9.11298514e-009  5.00000000e+000  4.74340123e+000
```

Текстовые данные в САПР (3)




```
#H
SOURCE='SYMSPICE'
TITLE='* # file name: F:\rc
SUBTITLE=''
TIME='08:37:36' DATE='9/11/2018'
ANALYSIS='TR'
TEMPERATURE=' 2.500000E+001'
SWEEPVAR='TIME'
COMPLEXVALUES='NO' FORMAT='1 VOLTSorAMPS;EFLOAT'
XBEGIN=' 0.000000e+000' XEND=' 1.000000e-007'
NODES='     2'
#N 'v(1)' 'v(2)'

#C     0.00000000e+000          2    0.00000000e+000   0.00000000e+000
#C     2.00000000e-009          2    0.00000000e+000   0.00000000e+000
#C     5.00000000e-009          2    0.00000000e+000   0.00000000e+000
#C     5.02386518e-009          2    5.96629438e-002   1.39067797e-003
#C     5.07159553e-009          2    1.78988831e-001   6.88855948e-003
#C     5.12889016e-009          2    3.22225398e-001   2.04634393e-002
#C     5.18236485e-009          2    4.55912118e-001   3.96611966e-002
#C     5.28931422e-009          2    7.23285558e-001   9.54911926e-002
#C     5.42992725e-009          2    1.07481814e+000   2.01060109e-001
```

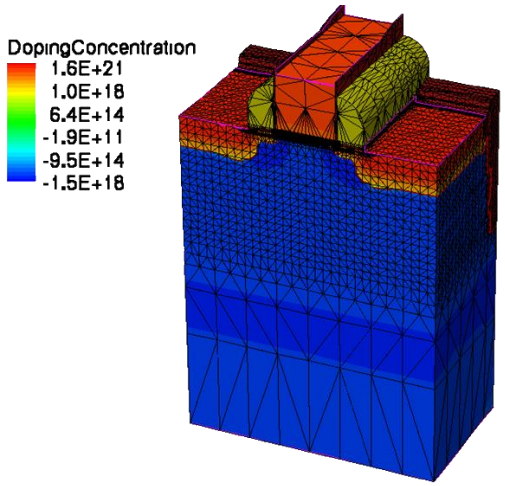
Текстовые данные в САПР (5)




```
$date
        Thu Nov 07 18:51:54 2024
$end
$version
        Icarus Verilog
$end
$timescale
        1ns
$end
$scope module inverter_tb $end
$var reg 1 ! x $end
$var wire 1 " y $end
$upscope $end
$enddefinitions $end
```

```
#0
$dumpvars
0!
1"
$end
#5
1!
0"
#10
0!
1"
#20
1!
0"
#30
0!
1"
#35
1!
0"
```

Текстовые данные в САПР (6)



C:\Users\Дмитрий Булах\Documents\cub_msh.grd -...

Файл Правка Поиск Вид Кодировки Синтаксисы Опции
Инструменты Макросы Запуск Плагины Вкладки ?

cub_msh.grd | cub_msh.dat

```
1   DF-ISE text
2
3   # filename: cub_msh.grd
4   # written by the library Delaunay
5   Info {
6   version     =  1.1
7   type        = grid
8   dimension   =  3
9   nb_vertices =  8
10  nb_edges    =  19
11  nb_faces    =  18
12  nb_elements =  6
13  nb_regions  =  1
14  regions     = [ "region_4" ]
15  materials     = [ Silicon ]
16   }
17  Data {
18  CoordSystem {
19  translate = [  0  0  0 ]
20  transform = [  1  0  0  0  1  0  0  0  1 ]
21   }
22  Vertices (  8) {
23   0 0 0
24   1 0 0
25   1 1 0
26   0 1 0
27   0 0 1
28   1 0 1
29   0 1 1
30   1 1 1
31   }
```

Ln : 37 Col : 5 Pos : 488 Unix (LF) UTF-8 INS

C:\Users\Дмитрий Булах\Documents\cub_msh.dat - Notepad++

Файл Правка Поиск Вид Кодировки Синтаксисы Опции Инструменты Макросы
Запуск Плагины Вкладки ?

cub_msh.grd | cub_msh.dat

```
1   DF-ISE text
2
3   # filename: cub_msh.dat
4   # written by the library Delaunay
5   Info {
6   version     =  1
7   type        = dataset
8   dimension   =  3
9   nb_vertices =  8
10  nb_edges    =  19
11  nb_faces    =  18
12  nb_elements =  6
13  nb_regions  =  1
14  datasets     = [ "DopingConcentration" "BoronActiveConcent
15  functions     = [ DopingConcentration BoronActiveConcentra
16   }
17  Data {
18  Dataset ("DopingConcentration") {
19  function = DopingConcentration
20  type = scalar
21  dimension =  1
22  location = vertex
23  validity = ["region_4"]
24  Values (  8) {
25   -1000000000000000
26   -1000000000000000
27   -1000000000000000
28   -1000000000000000
29   -1000000000000000
30   -1000000000000000
```

Ln : 1 Col : 1 Pos : 1 Unix (LF) UTF-8 INS

Текстовые данные в САПР (7)

C:\Users\Дмитрий Булах\source\repos\LayoutTools\bin\tests\inv.msk - Not...

Файл Правка Поиск Вид Кодировки Синтаксисы Опции Инструменты Макросы
Запуск Плагины Вкладки ?

xor.gds | xor.gds.txt | inv.msk

```
1   VERSION 5/13/2003 2:56:34 PM
2   FIG #C:\Documents and Settings\Administrator\My Documents\micro
3   BB(-2,-10,32,58)
4   SIMU #2.00
5   REC(-2,24,34,30,NW)
6   REC(13,34,4,8,DP)
7   REC(13,30,5,4,DP)
8   REC(7,30,4,8,DP)
9   REC(6,38,5,4,DP)
10  REC(5,-2,4,4,DP)
11  REC(13,14,5,4,DN)
12  REC(6,14,5,4,DN)
13  REC(5,46,4,4,DN)
14  REC(6,-1,2,2,CO)
15  REC(7,39,2,2,CO)
16  REC(6,47,2,2,CO)
17  REC(7,15,2,2,CO)
18  REC(9,-9,2,2,CO)
19  REC(9,55,2,2,CO)
20  REC(15,31,2,2,CO)
21  REC(15,15,2,2,CO)
22  REC(11,11,2,10,PO)
23  REC(8,-10,2,4,PO)
24  REC(10,56,2,2,PO)
25  REC(10,-8,3,19,PO)
26  REC(10,45,3,11,PO)
27  REC(10,-10,2,2,PO)
28  REC(8,54,2,4,PO)
29  REC(10,21,3,6,PO)
30  REC(11,27,2,18,PO)
```

length : Ln : 24 Col : 18 Pos : 522 | Windows (CR LF) | UTF-8 | INS

C:\Users\Дмитрий Булах\source\repos\LayoutTools\bin\tests\xor.gds.txt - ...

Файл Правка Поиск Вид Кодировки Синтаксисы Опции Инструменты Макросы
Запуск Плагины Вкладки ?

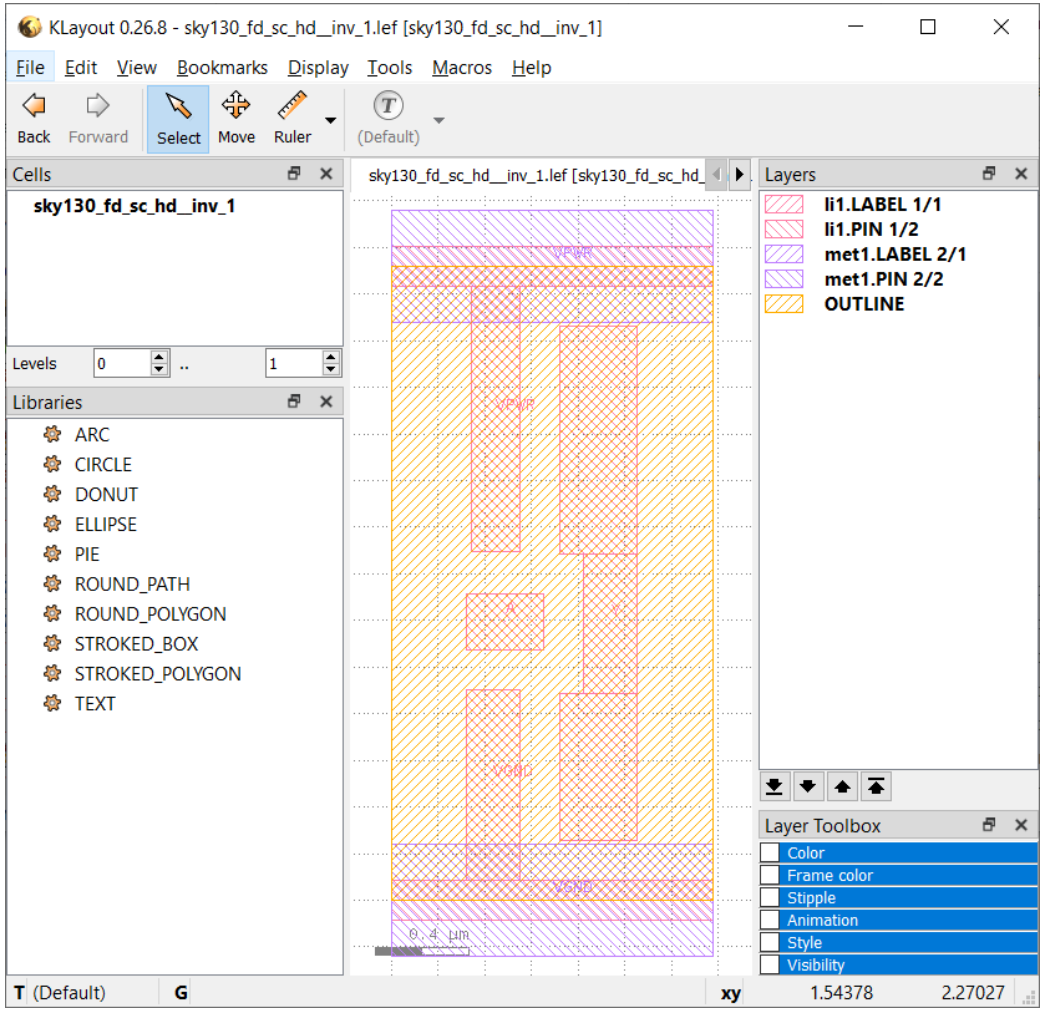
xor.gds | xor.gds.txt

```
1   HEADER 600
2   BGNLIB 6/2/2020 12:05:08 6/2/2020 12:05:08
3   LIBNAME owlvision.db
4   UNITS 0.001 1e-009
5
6   BGNSTR 6/2/2020 12:05:08 6/2/2020 12:05:08
7   STRNAME via
8
9   BOUNDARY
10  LAYER 49
11  DATATYPE 0
12  XY -2000: -2000
13  -2000: 2000
14  2000: 2000
15  2000: -2000
16  -2000: -2000
17  ENDEL
18
19  BOUNDARY
20  LAYER 51
21  DATATYPE 0
22  XY -2000: -2000
23  -2000: 2000
24  2000: 2000
25  2000: -2000
26  -2000: -2000
27  ENDEL
28
29  BOUNDARY
30  LAYER 50
31  DATATYPE 0
32  XY -1000: -1000
33  -1000: 1000
34  1000: 1000
```

length : Ln : 1 Col : 1 Pos : 1 | Windows (CR LF) | UTF-8 | INS

Текстовые данные в САПР (8)

```
VERSION 5.5 ;
NAMESCASESENSITIVE ON ;
BUSBITCHARS "[]" ;
DIVIDERCHAR "/" ;

MACRO sky130_fd_sc_hd__inv_1
  CLASS CORE ;
  ...

  PIN A
    ANTENNAGATEAREA  0.247500 ;
    DIRECTION INPUT ;
    USE SIGNAL ;
    PORT
      LAYER li1 ;
        RECT 0.320000 1.075000 0.650000 1.315000 ;
    END
  END A


END sky130_fd_sc_hd__inv_1
```



Текстовые данные в САПР (10)

```
COMPONENTS 3892 ;
    - FILLER_0_109 sky130_fd_sc_hd__decap_3 + SOURCE DIST + PLACED ( 55660 10880 ) N ;
    - FILLER_0_113 sky130_fd_sc_hd__decap_8 + SOURCE DIST + PLACED ( 57500 10880 ) N ;
    - FILLER_0_121 sky130_fd_sc_hd__fill_1 + SOURCE DIST + PLACED ( 61180 10880 ) N ;
    - FILLER_0_126 sky130_ef_sc_hd__decap_12 + SOURCE DIST + PLACED ( 63480 10880 ) N ;
...
    - _095_ sky130_fd_sc_hd__mux2_1 + PLACED ( 141220 176800 ) FS ;
    - _096_ sky130_fd_sc_hd__or2b_1 + PLACED ( 139840 174080 ) N ;
    - _097_ sky130_fd_sc_hd__o211a_1 + PLACED ( 141220 168640 ) FN ;
    - _098_ sky130_fd_sc_hd__mux4_1 + PLACED ( 148580 157760 ) FN ;
    - _099_ sky130_fd_sc_hd__and2b_1 + PLACED ( 148580 163200 ) FN ;
    - _100_ sky130_fd_sc_hd__mux2_1 + PLACED ( 161460 187680 ) FS ;
    - _101_ sky130_fd_sc_hd__mux2_1 + PLACED ( 160080 195840 ) N ;
    - _102_ sky130_fd_sc_hd__or2b_1 + PLACED ( 155480 195840 ) N ;
    - _103_ sky130_fd_sc_hd__o211a_1 + PLACED ( 155020 193120 ) FS ;
...
```

Текстовые данные в САПР (11)

```
NETS 168 ;
- net15 ( input15 X ) ( _157_ A1 ) + USE SIGNAL
      + ROUTED met2 ( 168590 197370 ) ( * 199410 )
      NEW met1 ( 78890 199410 ) ( 168590 * )
      NEW li1 ( 78890 199410 ) L1M1_PR_MR
      NEW li1 ( 168590 197370 ) L1M1_PR_MR
      NEW met1 ( 168590 197370 ) M1M2_PR
      NEW met1 ( 168590 199410 ) M1M2_PR
      NEW met1 ( 168590 197370 ) RECT ( -355 -70 0 70 )  ;
 - net16 ( input16 X ) ( _159_ A1 ) + USE SIGNAL
      + ROUTED met1 ( 182390 15130 ) ( 192510 * )
      NEW met2 ( 182390 15130 ) ( * 139910 )
      NEW met1 ( 182390 15130 ) M1M2_PR
      NEW li1 ( 192510 15130 ) L1M1_PR_MR
      NEW li1 ( 182390 139910 ) L1M1_PR_MR
      NEW met1 ( 182390 139910 ) M1M2_PR
      NEW met1 ( 182390 139910 ) RECT ( -355 -70 0 70 )  ;
```