

Ministry of Education and Science of Ukraine

***Odessa National Academy
of Food Technologies***



International Competition of Student Scientific Works

BLACK SEA SCIENCE 2020

Information Technology, Automation and Robotics

Proceedings

Odessa, ONAFT 2020

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Introduction

As you know, 'the world is evolving and we are evolving along h it', this development encompasses everything, every area of our life, and we must not lose sight of it.

The development of mankind is a very complex process. There is no doubt that the role of modern technology in today's life is immense. The capabilities of modern technology may be far greater than human beings, but we must remember that it was created by humans to simplify life and save time.

Knowledge of the key aspects of information technology and computer software enables us to collect, modify and disseminate information. While working on this project, one of our goals was to show you our knowledge of the subject.

there are many ways of creating databases, but when we are dealing with small data we don't need to use big database tools like MySQL or Oracle. It's also possible to use local or mini databases, most famous local database program is - **Microsoft Access** - which is only program I know, so that's why I think it's the best. I also tried to use JSON as database, it's very easy to send and receive data from user to server. There is also a thing called search engine, we need 3 parameters for it, one is formed automatically, the rest two user must input it. This paragraph is dedicated for my beloved students so they can learn the wonders world of databases and search engines.

Literature analysis

We use JSON. JSON (JavaScript Object Notation) is a lightweight data-interchange format. It is easy for humans to read and write. It is easy for machines to parse and generate. It is based on a subset of JavaScript Standard Programming Language ECMA-262 3rd Edition - December 1999. JSON is a fully independent text format but uses conventions that are familiar to programmers of the C-family of languages, including C, C ++, C #, Java, JavaScript, Perl, Python, and many others. These properties make JSON an ideal data-interchange language.

JSON is built on two structures:

A collection of name / value pairs. In various languages, this is realized as an object, record, struct, dictionary, hash table, keyed list, or associative array.

An ordered list of values. In most languages, this is realized as an array, vector, list, or sequence.

These are universal data structures. Virtually all modern programming languages support them in one form or another. It makes sense that a data format that is interchangeable with programming languages would also be based on these structures.

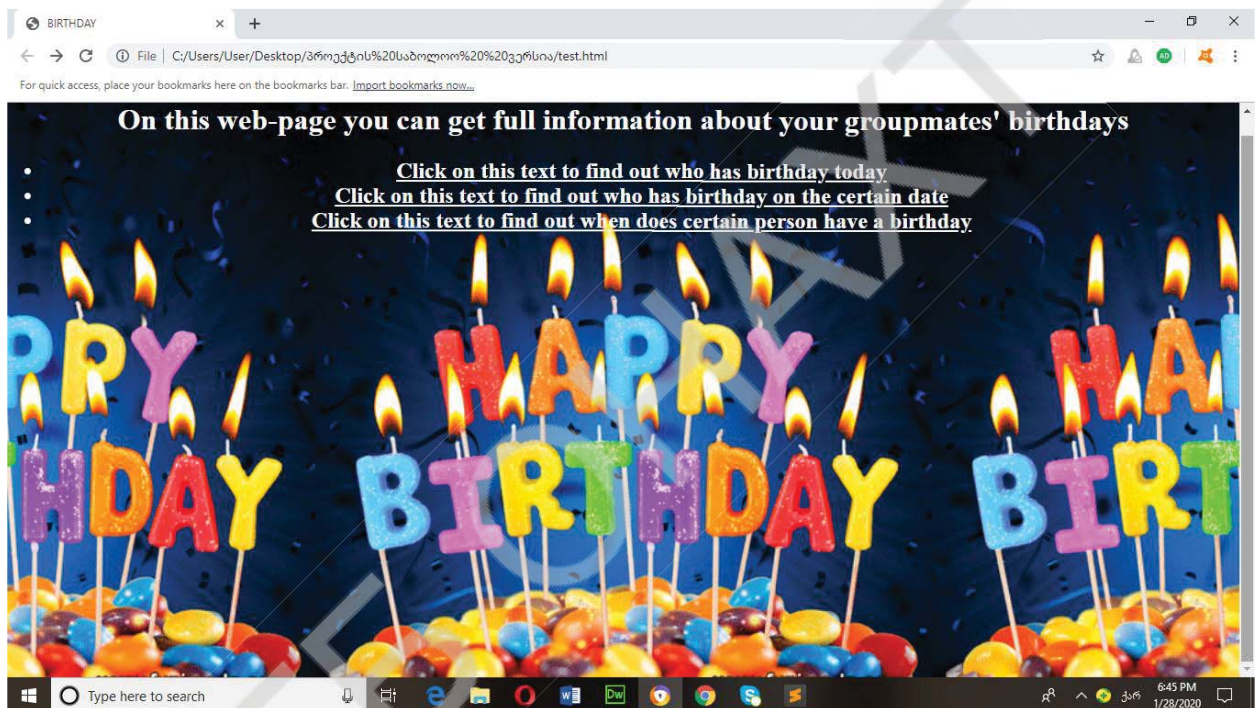
Result

We have created a simple, effective and user-friendly website tailored to the user and provides him with three types of information through simple actions:

1. Who has a birthday today
2. Who has a birthday on a particular day
3. When does a particular person have a birthday?

Obviously, when using the site, the user first focuses on its visual side, so we tried to have a user-friendly, thematic design.

We will see all of this as a link upon logging into the website. The first page looks visually like this



Which is the result of the realization of the following code

Listing 1

```
<!DOCTYPE html>
<html>
<head>
<title>BIRTHDAY</title>
<meta name="viewport">
<style>
    body, html { height: 100%;
                  margin: 0; }
</style>
</head>

<body>
    <header style="background-image:
```

```
linear-gradient(rgba(0,0,0,0),rgba(0,0,0,0)),
url(hb.gif);
height: 100vh;
background-size: 50%;
background-position: center;">
```

```
<h1 align=center> <font color="white">On this web-page you can get full information
about your groupmates' birthdays </font></h1>
```

```
<h2>
  <font color="white">
<ul align=center>
  <li >
    <a href=1.html> <font color="white">Click on this text to find out who has birthday
today</a>
  </li>
  <li>
    <a href=2.html> <font color="white">Click on this text to find out who has birthday on
the certain date</a>
  </li>
  <li>
    <a href=3.html> <font color="white">Click on this text to find out when does certain
person have a birthday</a>
  </li>
</ul>
  </font>
</h2>

</body>
</html>
```

When we click on the first link, we will move to a new page, to check if anyone has a birthday today.

Listing 2

```
<!DOCTYPE html>
<html>
<head>
<title>BIRTHDAY</title>
<style> body, html {height: 100%;
                margin: 5;}
div {margin-left: 20px; }
</style>
</head>
<body>
```

```
<header style="background-image:
linear-gradient(rgba(0,0,0,0.1),rgba(0,0,0,0.1)),
url(cake1.jpg);
height: 100vh;
background-size: cover;
background-position: center;
background-attachment: fixed;">
<br><br>
<h2 align=center> On this web-page we can find out who has birthday today</h2>
<p id="demo"></p>
<div><script src="one.js" ></script></div>
</body>
</html>
```

As you can see in this code is indicated file address js. The database is stored in this file and uses JSON for this.

Listing 3

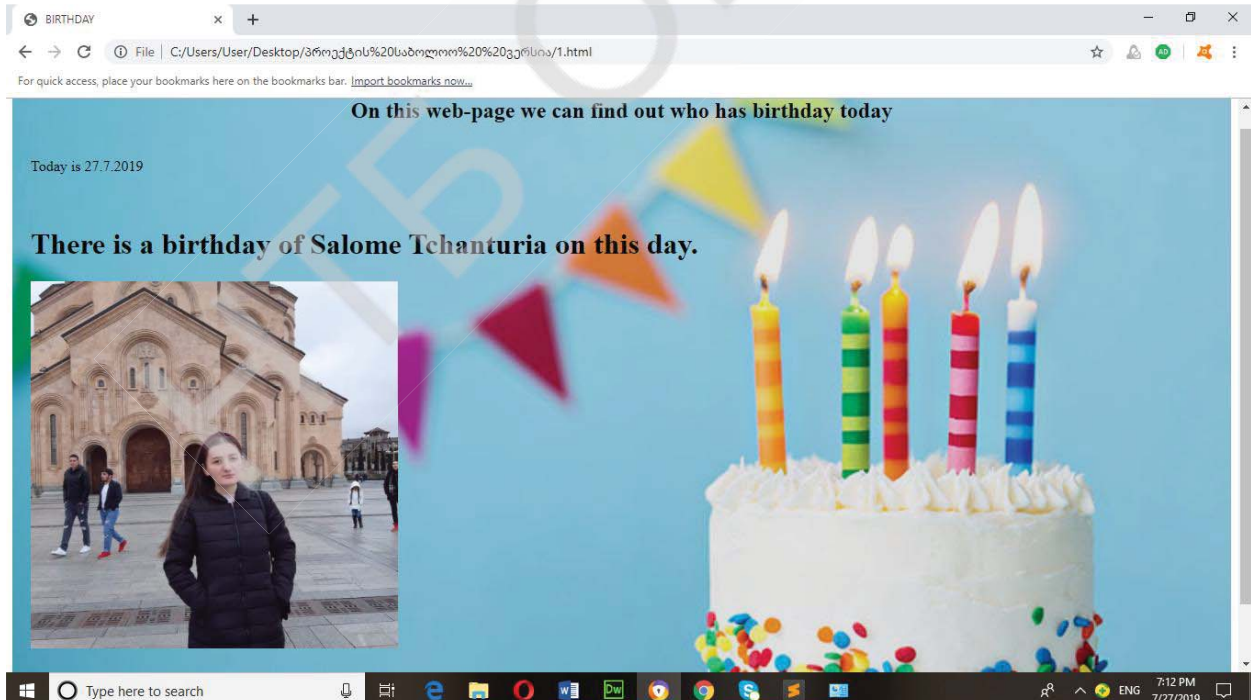
```
var d = new Date();
var a = d.getDate();
var b = d.getMonth()+1;
var c = d.getFullYear();
var e = d.getFullYear();
document.write("<br align=center>", "Today is ", a, ".", b, ".", c, "<br>");
var text = '{"chveni_jgufi":[' +
    '{"firstName":"Besarion",
"lastName":"Anjafaridze","day":28,"month":12,"year":"1998","img":"besa.jpg"},' +
    '{"firstName":"Ana",
"lastName":"Ediberidze","day":"12","month":9,"year":"1997","img":"ana.jpg"},' +
    '{"firstName":"Salome",
"lastName":"Tchanturia","day":"27","month":7,"year":"1998","img":"salo.jpg"},' +
    '{"firstName":"Eka",
"lastName":"Onezashvili","day":"20","month":1,"year":"1998","img":"eka.jpg"},' +
    '{"firstName":"Ucha",
"lastName":"Todria","day":"18","month":7,"year":"1997","img":"ucha.jpg"},' +
    '{"firstName":"Lia",
"lastName":"Ormotsadze","day":"25","month":9,"year":"1998","img":"lika.jpg"},' +
    '{"firstName":"Nino",
"lastName":"Bagalishvili","day":"17","month":3,"year":"1998","img":"nini.jpg"},' +
    '{"firstName":"Valeri",
"lastName":"Kalandadze","day":20,"month":12,"year":"1989","img":"valeri.jpg"}]};
obj = JSON.parse(text);
for (i = 0; i < obj.chveni_jgufi.length; i++) {
```

```

if (obj.chveni_jgufi[i].day == a && obj.chveni_jgufi[i].month == b) {
    e = c - obj.chveni_jgufi[i].year;
    if (e % 5 == 0) {
        document.write("<h1>There is a jubilee of ",
obj.chveni_jgufi[i].firstName, " ", obj.chveni_jgufi[i].lastName, " on this day. He(She)
became ", e, " year</h1>");
        document.write("");
    } else {
        document.write("<h1>There is a birthday of ",
obj.chveni_jgufi[i].firstName, " ", obj.chveni_jgufi[i].lastName, " on this day.</h1>")
        document.write("");
    }
};
obj.chveni_jgufi[i].firstName + " " + obj.chveni_jgufi[i].lastName + " Date of birthday: "
+ obj.chveni_jgufi[i].day + " " + obj.chveni_jgufi[i].month + " " +
obj.chveni_jgufi[i].year + " year.";
document.write("<br>");
}

```

The result looks visually like this



When moving to the second and third links, unlike the first, we search for information through forms ourselves. According, if we are interested in whose birthday is in a specific number. We will go to the second link and we will see a window appear, where we have the number first and then the month. It's code is

Listing 4

```
<html>
<head>
<title>BIRTHDAY</title>
<meta name="viewport">
<style>
    body, html {
        height: 100%;
        margin: 5; }
    div {
margin-left: 20px;
    }
</style>
</head>
<body>
    <header style="background-image:
linear-gradient(rgba(0,0,0,0.1), rgba(0,0,0,0.1)),
url(cake1.jpg);
height: 100vh;
background-size: cover;
background-position: center;
background-attachment: fixed;">
    <h2 align=center>On this web-page you can find out who has birthday on the certain
date</h2>
    <p id="demo"></p>

<div><script src="two.js" ></script></div>
</body>
</html>
```

In this code is indicated file address js. In which the database is stored and uses JSON for this

Listing 5

```
var d = new Date();
var a = d.getDate();
var b = d.getMonth()+1;
var c = d.getFullYear();
var e = d.getFullYear();
a = prompt("Insert the birthday number");
b = prompt("Insert number of the birth month");
document.write("<br>", "The date you have entered is ", a, ".", b, ".", c, "<br>");
var text = '{"chveni_jgufi":[' +
```

```

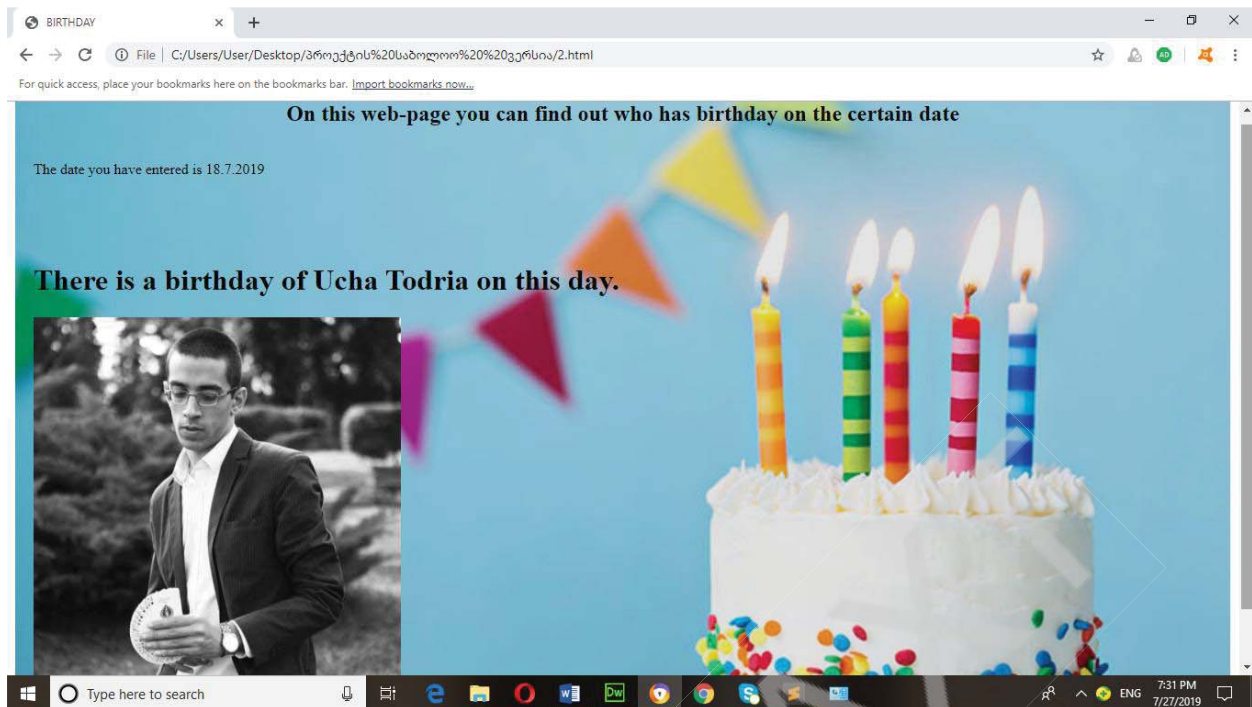
'{"firstName":"Besarion","lastName":"Anjafaridze","day":28,"month":12,"year":"1998","img":
":besa.jpg"},' +
'{"firstName":"Ana",
  "lastName":"Ediberidze","day":"12","month":9,"year":"1997","img":"ana.jpg"},' +

'{"firstName":"Salome","lastName":"Tchanturia","day":"27","month":7,"year":"1998","img"
:":salo.jpg"},' +
'{"firstName":"Eka",
"lastName":"Onezashvili","day":"20","month":1,"year":"1998","img":"eka.jpg"},' +
'{"firstName":"Ucha",
"lastName":"Todria","day":"18","month":7,"year":"1997","img":"ucha.jpg"},' +
'{"firstName":"Lia",
"lastName":"Ormotsadze","day":"25","month":9,"year":"1998","img":"lika.jpg"},' +
'{"firstName":"nino",
"lastName":"Bagalishvili","day":"17","month":3,"year":"1998","img":"nini.jpg"},'+
'{"firstName":"Valeri","lastName":"Kalandadze","day":5,"month":12,"year":"1989","img":":v
aleri.jpg"}]}}';
obj = JSON.parse(text);
for (i = 0; i < obj.chveni_jgufi.length; i++) {
  if (obj.chveni_jgufi[i].day == a && obj.chveni_jgufi[i].month == b) {
    e = c - obj.chveni_jgufi[i].year;
    if (e % 5 == 0) {
      document.write("<h1>There is a jubilee of ", obj.chveni_jgufi[i].firstName, " ",
obj.chveni_jgufi[i].lastName, ". He(She) became ", e, " year</h1>");
      document.write("");
    } else {
      document.write("<h1>There is a birthday of ", obj.chveni_jgufi[i].firstName, " ",
obj.chveni_jgufi[i].lastName, " on this day.</h1>")
      document.write("");
    }
  }
};

obj.chveni_jgufi[i].firstName + " " + obj.chveni_jgufi[i].lastName + " Date of birth: " +
obj.chveni_jgufi[i].day + " " + obj.chveni_jgufi[i].month + " " + obj.chveni_jgufi[i].year
+" year.";
document.write("<br>");
}

```

The result looks visually like this



The same is true in the third, the only difference here is that when we move to the link in the disabled window, we will enter the person's name and surname (in the first-name, in the second-surname). Because we know when he has a birthday. All this is done, through html code, it is also mentioned here address of the is file. See below html and js codes

Listing 6

```
<html>
<head>
<title>BIRTHDAY</title>
<meta name="viewport">
<style>
    body, html {
        height: 100%;
        margin: 5;
    }
    div {
margin-left: 20px;
    }
</style>
</head>
<body>
    <header style="background-image:
        linear-gradient(rgba(0,0,0,0.1),rgba(0,0,0,0.1)),
        url(cake1.jpg);
```

```
height: 100vh;  
background-size: cover;  
background-position: center;  
background-attachment: fixed;">
```

```
<h2 align=center>On this web-page you can find out when does certain person have a  
birthday</h2>
```

```
<p id="demo"></p>  
<div><script src="three.js"></script></div>
```

```
</body>  
</html>
```

Listing 7

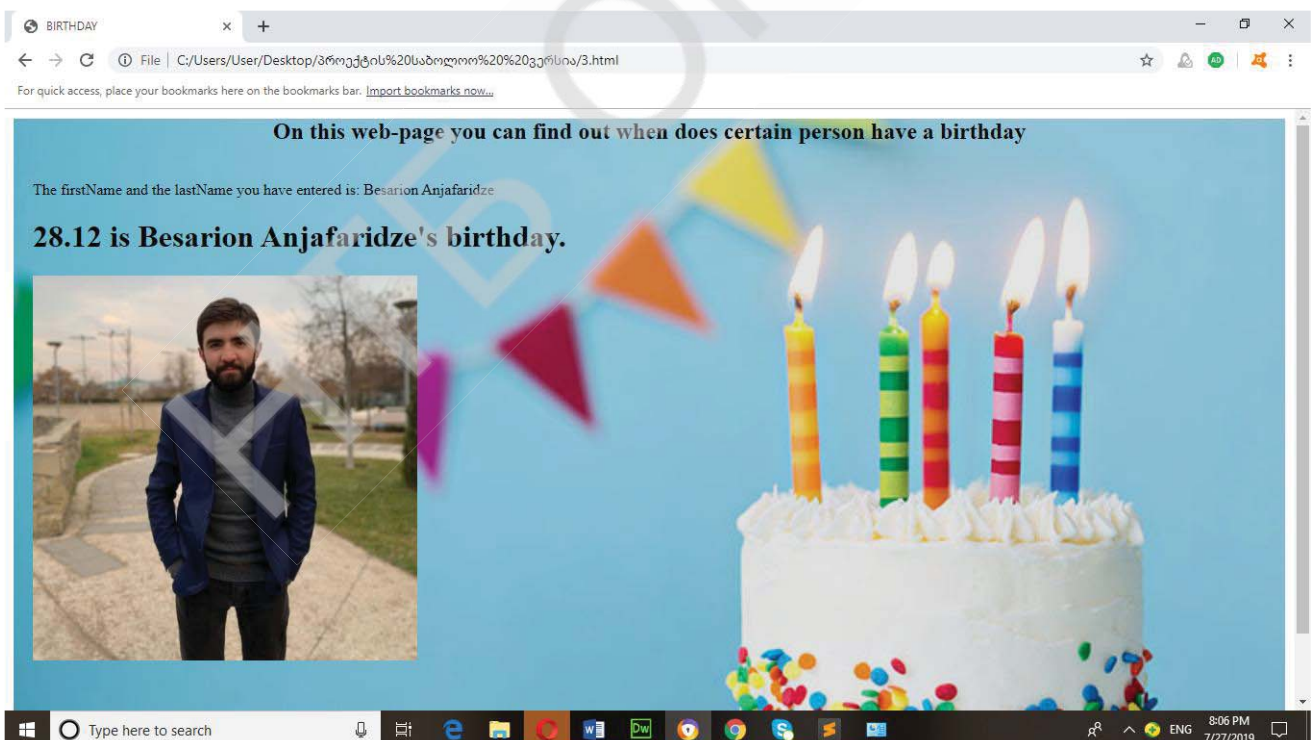
```
var d = new Date();  
var a = d.getDate();  
var b = d.getMonth()+1;  
var c = d.getFullYear();  
var e = d.getFullYear();  
f = prompt("Enter the firstName");  
g = prompt("Enter the lastName");  
document.write("<br>","The firstName and the lastName you have entered is: ",f," ",g,  
"<br>");  
var text = '{"chveni_jgufi":['+  
  '{"firstName":"Besarion",  
"lastName":"Anjafaridze","day":28,"month":12,"year":"1998","img":"besa.jpg"},'+  
  '{"firstName":"Ana",  
"lastName":"Ediberidze","day":"12","month":9,"year":"1997","img":"ana.jpg"},'+  
  '{"firstName":"Salome",  
"lastName":"Tchanturia","day":"27","month":7,"year":"1998","img":"salo.jpg"},'+  
  '{"firstName":"Eka",  
"lastName":"Onezashvili","day":"20","month":1,"year":"1998","img":"eka.jpg"},'+  
  '{"firstName":"Ucha",  
"lastName":"Todria","day":"18","month":7,"year":"1997","img":"ucha.jpg"},'+  
  '{"firstName":"Lia",  
"lastName":"Ormotsadze","day":"25","month":9,"year":"1998","img":"lika.jpg"},'+  
  '{"firstName":"nino",  
"lastName":"Bagalishvili","day":"17","month":3,"year":"1998","img":"nini.jpg"},'+  
  '{"firstName":"Valeri",  
"lastName":"Kalandadze","day":5,"month":12,"year":"1989","img":"valeri.jpg"}]};'  
obj = JSON.parse(text);  
for(i=0;i<obj.chveni_jgufi.length;i++)  
{
```

```

if(obj.chveni_jgufi[i].firstName==f && obj.chveni_jgufi[i].lastName==g)
    {e=c-obj.chveni_jgufi[i].year;
    if(e%5==0)
    {document.write("<h1>",obj.chveni_jgufi[i].day,".",obj.chveni_jgufi[i].month,"          is
    ",obj.chveni_jgufi[i].firstName," ",obj.chveni_jgufi[i].lastName,"s jubilee birthday. He
    (She) was ", e, " years old</h1>");
        document.write("");}
    else
    {document.write("<h1>",obj.chveni_jgufi[i].day,".",obj.chveni_jgufi[i].month,"          is
    ",obj.chveni_jgufi[i].firstName," ",obj.chveni_jgufi[i].lastName,"s birthday.</h1>")
        document.write("");}};

obj.chveni_jgufi[i].firstName + " " + obj.chveni_jgufi[i].lastName + " Date of birth: " +
obj.chveni_jgufi[i].day + " " + obj.chveni_jgufi[i].month + " " + obj.chveni_jgufi[i].year
+" years.";
document.write("<br>");
}
    
```

The result looks visually like this



Conclusion

As you know, the third revolution is related to the computer era, automation and the creation and development of robotics. The goal of this revolution is a symbiosis of computer technology, artificial intelligence, and automation. Eminent writers of the

twentieth century have described an era where the main function of man is to manage robots and artificial intelligence. All this is promised by Industry 4.0 today.

Take, for example, any factory / production that fits into the 4.0 model:

** All operations of this factory are automated;

** Introduced auto-monitoring system;

** Machines / installations are fully computer driven;

** Computers can learn, analyze situations, and make optimal, independent decisions for the enterprise.

Therefore, any business is in charge of keeping an eye on innovations in its field, timely implementing these innovations, developing a new model of competitiveness, and adapting timely to these changes.

Modern technology makes it easy, fast, efficient, secure, tailor-made, inexpensive, and so on. If you used to spend a lot of time, energy, money, and now in just a few seconds you can send information anywhere ... And electronic signatures can be said to be one of the great achievements of modernity when you can handle anything without leaving the room, with a range of security measures with protection.

THE USE OF SUPERVISED LEARNING IN ROBOTICS

Author: Sophia Serdyuk

Supervisor: Maryna Malakhova

VN Karazin Kharkiv National University (Ukraine)

***Abstract.** In this paper, there are considered definitions of the direct and inverse kinematics. The solution of inverse kinematics problem is shown in detail on the example of the kinematic scheme of the manipulator. Also, it is discovered the concept of degrees of freedom and coordinate system.*

The example of path-planning shows the process of moving the robot along a curved path, determining the angle and distance that robot needs to go to the next point of the path.

Machine learning is also considered to be a unit of artificial intelligence. Classification and regression are found to be the main tasks of supervised learning. There were analyzed cases in which regression or classification are applied and were given examples of application of machine learning in the modern world and robotics.

This science paper contains 15 pages and 4 figures.

***Keywords:** Inverse Kinematics Problem, Manipulator, Path-Planning, Machine Learning, Classification, Regression.*

I. Introduction

Nowadays the need of using robots is growing more and more in various spheres of human life. The use of machine learning in robotics extends their application, facilitates human labor, and is highly efficient through the handling with the large amounts of data,