

Web Application Security

Rajendra Kachhwaha
rajendra1983@gmail.com

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Outline

- 1 Basic of CAPTCHA
- 2 Example of CAPTCHA
- 3 How to create CAPTCHA

Definition

- 1 A CAPTCHA is a type of challenge-response test used in computing to determine whether or not the user is human.
- 2 A CAPTCHA is an acronym for “**C**ompletely **A**utomated **P**ublic **T**uring test to tell **C**omputers and **H**umans **A**part”.
- 3 The form of CAPTCHA requires that the user type the letters of a distorted image, sometimes with the addition of an obscured sequence of letters or digits that appears on the screen.
- 4 CAPTCHAs are by definition fully automated, requiring little human maintenance or intervention to administer. This has obvious benefits in cost and reliability.

Characteristics:



- 1 **Invariant recognition** refers to the ability to recognize the large amount of variation in the shapes of letters. There are nearly an infinite number of versions for each character that a human brain can successfully identify. The same is not true for a computer, and teaching it to recognize all those differing formations is an extremely challenging task.
- 2 **Segmentation**, or the ability to separate one letter from another, is also made difficult in CAPTCHAs, as characters are crowded together with no white space in between.
- 3 **Context** is also critical. The CAPTCHA must be understood holistically to correctly identify each character. For example, in one segment of a CAPTCHA, a letter might look like an m. Only when the whole word is taken into context does it become clear that it is a “u” and an “n”.

Example of CAPTCHA:Image based

1 **Answer:**

Secondary email:
This address is used to authenticate your account should you ever encounter problems or forget your password. If you do not have another email address, you may leave this field blank. [Learn More](#)

Location:

Word Verification: Type the characters you see in the picture below.

 
Letters are not case-sensitive

Terms of Service: Please check the Google Account information you've entered above (feel free to change anything you like), and review the Terms of Service below.

2



Type the two words:

ReCAPTCHA™
stop spam.
read books.

Example of CAPTCHA: Calculation based

Please read the question below and enter the answer in the text box

What is the result of (2 x 9)

Submit

Taken from:

<https://customer.onlinelic.in/LICEPS/Login/secureLogin.do>

Example of CAPTCHA:3D object

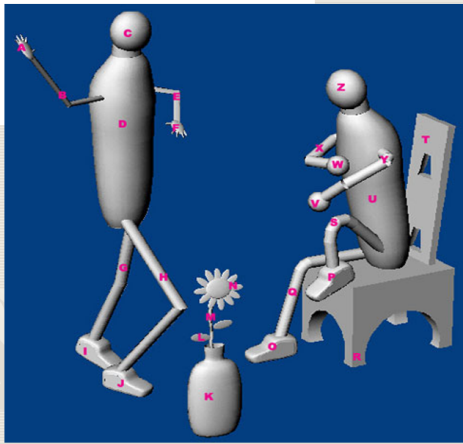
Please click on or enter each letter corresponding to the following list in the field below. You must enter them in the exact sequence listed.

- The Head of the Walking Man
- The Vase
- The Back of the Chair

Enter Letters Here:

We now have the
code:

CKT



Creating CAPTCHA

Different types of CAPTCHA:

- 1 Image based
- 2 Calculation based
- 3 Many more....example 3D, Handwritten.

I am giving you details of first two.

I use Visual studio .NET environment with C# for creating CAPTCHA.

Creating CAPTCHA:Image based

Email ID :

Password :

Confirm Password :

Enter Below Code :

N883Gq

Creating CAPTCHA:Image based

For this we create two web-pages: GenerateCaptcha.aspx & Registration.aspx

1. In GenerateCaptcha.aspx.cs file

Page_Load() function: Make an image with height = 30; width = 100; Make a rectangle with red border, write the session string in the image using following line:

```
g.DrawString(Session["captcha"].ToString(), newFont("Thaoma", 12, FontStyle.Italic), Brushes.Green, rectf);
```

cont.

Creating CAPTCHA:Image based

2. In Registration.aspx.cs file

Page_Load() function: Make a function FillCapctha().

FillCapctha() function:

```
void FillCapctha()
{
    try
    {
        Random random = new Random();
        string combination = "0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz";
        StringBuilder captcha = new StringBuilder();
        for (int i = 0; i < 6; i++)
            captcha.Append(combination[random.Next(combination.Length)]);
        Session["captcha"] = captcha.ToString();
        imgCapctha.ImageUrl = "GenerateCapctha.aspx?" + DateTime.Now.Ticks.ToString();
    }
    catch
    {
        throw;
    }
}
```

cont.

Creating CAPTCHA:Image based

```
protected void btnRefresh_Click(object sender, EventArgs e)
{
    FillCapctha();
}

protected void btnRegister_Click(object sender, EventArgs e)
{
    if (Session["captcha"].ToString() != txtCaptcha.Text)
        Response.Write("Invalid Captcha Code");
    else
        Response.Write("Valid Captcha Code");
    FillCapctha();
}
```

Creating CAPTCHA: Calculation based

- 1 Make a session variable in Global.asax file, in Session_Start() function.

```
Session["Sum"] = "";
```

- 2 In login.aspx.cs file, in Page_Load() function: generate random numbers and put their sum in session variable as follows:

- i. Random rnum1 = new Random();
- ii. a = rnum1.Next(11, 20);
- iii. Random rnum2 = new Random();
- iv. b = rnum1.Next(21, 50);
- v. sum = a + b;
- vi. Session["Sum"] = sum.ToString();

cont.

Creating CAPTCHA: Calculation based

- In login.aspx.cs file, in `lbtnLogin_Click()` function: check for the correct sum result given by user in a text box (names as `sum_txt1`). If it matches, allow user otherwise denies access.

```
if (Session["Sum"].ToString() == sum_txt1.Value.ToString())
```

```
    Allow user to login....
```

```
else
```

```
    Don't allow user.
```

Creating CAPTCHA: Calculation based

Example:

Login-Id:

Password:

What is $(19 + 22) =$

LOGIN

Login-Id:

Password:

What is $(13 + 33) =$

LOGIN