

NAME OF STUDENT:	CLASS: BE
SEMESTER/YEAR: VII	ROLL NO:
DATE OF PERFORMANCE:	DATE OF SUBMISSION:
EXAMINED BY:	EXPERIMENT NO:

**TITLE:** CAPTCHA image

**AIM/PROBLEM STATEMENT:** Implement a program to generate and verify CAPTCHA image

**OBJECTIVES:**

- To understand various vulnerabilities and use of various tools for assessment of vulnerabilities

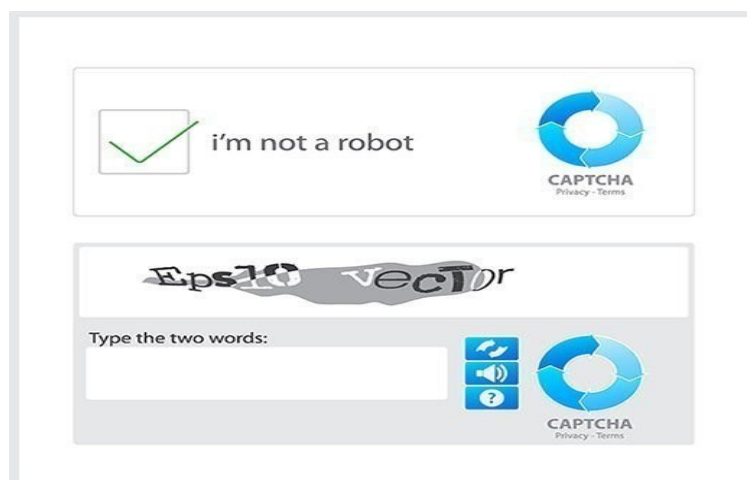
**OUTCOMES:**

- Identify various vulnerabilities and demonstrate using various tools.

**THEORY:**

CAPTCHA (Completely Automated Public Turing test to tell Computers and Humans Apart) is a type of security measure known as challenge-response authentication. It is a test to determine whether the user is human or not.

CAPTCHA helps protect you from spam and password decryption by asking you to complete a simple test that proves you are human and not a computer trying to break into a password protected account.



**History of CAPTCHA**

The need for CAPTCHAs began as far back as 1997. At that time, the internet search engine AltaVista was looking for a way to block automated URL submissions to the platform that were skewing the search engine's ranking algorithms.

To solve the problem, Andrei Broder, formerly AltaVista's chief scientist, developed an algorithm that randomly generated an image of printed text. Although computers could not

recognize the image, humans could read the message the image contained and respond appropriately. Broder and his team were issued a patent for the technology in April 2001.

In 2003, Nicholas Hopper, Manuel Blum, Luis von Ahn of Carnegie Mellon University, and John Langford of IBM perfected the algorithm and coined the term CAPTCHA for Completely Automated Public Turing Test to Tell Computers and Humans Apart.

A Turing test uses artificial intelligence (AI) to determine whether a computer is capable of thinking like a human being or not. It is named after its founder, Alan Turing, a computer scientist, cryptanalyst, mathematician and theoretical biologist.

Jason Polakis, a professor in computer science, took credit for an increase in CAPTCHA difficulty in 2016 when he published a paper where he used image recognition tools to solve Google image CAPTCHAs with an accuracy of 70%. Polakis believes we are at a point at which making CAPTCHAs harder for software to solve will now simultaneously make it more difficult for humans to solve.

### **Different types of CAPTCHAs**

The most common type of CAPTCHA is the text CAPTCHA, which requires the user to view distorted letters or distorted text, usually containing a string of alphanumeric characters in an image, and enter the characters in an attached form.

This throws off bots that are typically trained in pattern recognition and are simply unable to react independently as a human would. Text CAPTCHAs are also rendered as MP3 audio CAPTCHAs to meet the needs of the visually impaired. Just as with images, bots can detect the presence of an audio file, but only a human can listen and know the information the file contains.

Another common CAPTCHA uses picture recognition by asking users to identify a subset of images within a larger set of images. For instance, the user may be given a set of images and asked to click on all the ones that have cars, buses or street signs in them.

Arkose Labs ML models for 3D questions used for fraud prevention purposes

Cybersecurity vendor Arkose Labs implements ML models to generate 3D questions for fraud prevention purposes.

### **Other forms of CAPTCHAs include:**

- **Math CAPTCHA.** Requires the user to solve a basic math problem, such as adding or subtracting two numbers.
- **3D Super CAPTCHA.** Requires the user to identify an image rendered in 3D.
- **I am not a robot CAPTCHA.** Requires the user to check a box.
- **Marketing CAPTCHA.** Requires the user to type a particular word or phrase related to the sponsor's brand.

### **How does the CAPTCH WORK ?**

A CAPTCHA test is made up of two simple parts: a randomly generated sequence of letters and/or numbers that appear as a distorted image, and a text box. To pass the test and prove your human identity, simply type the characters you see in the image into the text box.

Quite simply, CAPTCHA works by asking end users to perform some task that a software bot cannot do. If the user can do the task correctly, it provides authentication to the service that the user is a human being and not a spambot and allows the user to continue. Tests often involve JPEG or GIF images because while bots can identify the existence of an image by reading source code, they cannot tell what the image depicts.

Because some CAPTCHA images are difficult to interpret, human users are usually given the option to request a new CAPTCHA test. CAPTCHA helps protect you from spam and password decryption by asking you to complete a simple test that proves you are human and not a computer trying to break into a password protected account

### **Algorithm:**

The set of characters to generate CAPTCHA are stored in a character array `chrs[]` which contains (a-z, A-Z, 0-9), therefore size of `chrs[]` is 62.

To generate a unique CAPTCHA every time, a random number is generated using `rand()` function (`rand()%62`) which generates a random number between 0 to 61 and the generated random number is taken as index to the character array `chrs[]` thus generates a new character of `captcha[]` and this loop runs `n` (length of CAPTCHA) times to generate CAPTCHA of given length.

### **Advantages and disadvantages of CAPTCHAs**

#### **Advantages of CAPTCHAs include:**

- They prevent spam from automated programs that could send emails, comments or advertisements.
- They prevent fake registrations or sign-ups for websites.
- CAPTCHAs are familiar, so website visitors automatically understand what they are tasked to do.
- CAPTCHAs are also easy to implement in building a website.

#### **Disadvantages of CAPTCHAs include:**

- CAPTCHAs are not fool proof and can only limit spam.
- They can be time consuming or annoying to end users.
- To some people, CAPTCHAs may be challenging to read.
- Websites using CAPTCHAs may notice traffic decreases because users find the tasks difficult.

**CONCLUSION:** Thus, we have implemented image captcha successfully.

### **QUESTIONS:**

1. What's the purpose of CAPTCHA technology and how does it work ?
2. How attackers defeat CAPTCHAs ?