

CAPTCHAs

Past, Present, and
Future



Sign up!

Sign up for your very own Yahoo! ID and Password. When you've completed this form, you'll have access to **all** of Yahoo!'s Personalized Services, including:

My Yahoo!, Calendar, Chat, Classifieds, Email, Games, Message Boards, Pager, Portfolios, Travel, and more!

Note: If you've used any of these Yahoo! services, you do **not** need to sign up again. You can [sign in](#) using your existing Yahoo! ID and Password.

1. Create Your Yahoo! ID and Password

Yahoo! ID:
(examples: johnm or Joe_Bloggs or CoolDude56)

Password:

Re-enter Password:

Password Question:

asked if you forget your password

(for example: What is my favorite pet's name?)

Secret Answer:

required to retrieve your password

(for example: B.J.)

Current Email Address:

used to verify your account

2. Personal Account Information

The information you provide here will help us maintain your account and provide you with more relevant news, information and ads. Your submission of this form will constitute your consent to the collection and use of this information. For more information regarding your privacy, please see our [Privacy Policy](#).

your First Name
(optional)

your Last Name
(optional)

your Birthdate / /
In case you forget your password.

your Gender

your Industry

your Occupation

your 5-digit Zip Code

If you are **NOT** a United States (50 state) resident, please continue with

From time to time, we would like to contact you about specials and new products.

Yes, please contact me using:

The email address above Please don't contact me.

3. Tell Us About Your Interests (Optional)

Tell us something about what you like. This will help us choose the kind of content we should display on your pages.

- | | |
|--|---|
| <input type="checkbox"/> Entertainment | <input type="checkbox"/> Business |
| <input type="checkbox"/> Home & Family | <input type="checkbox"/> Computers & Technology |
| <input type="checkbox"/> Health | <input type="checkbox"/> Personal Finance |
| <input type="checkbox"/> Music | <input type="checkbox"/> Small Business |
| <input type="checkbox"/> Shopping | <input type="checkbox"/> Travel |
| <input type="checkbox"/> Sports & Outdoors | |

4. Review and Submit

Please review your entries above.

·

The Problem

The Problem

1. Bots can submit online forms magnitudes faster than humans
2. This allows for spam submissions (accounts, posts, comments)
3. This causes an unfriendly environment for users.

“ **10 problems we don't know how to solve** ”

- Will it ever be solved?

Solution: CAPTCHA

Completely

Automated

Public

Turing test to tell

Humans and

Computers

Apart

Approach #1

1. Find a *task* difficult for computers, easy for humans.
2. Automate it.

Image Recognition!

Image Recognition Idea

1. Collect many many images.
2. Ask the user to label one.

Issues:

- Label *what* in the image?
- i18n: What if I don't know English?
- What if I can't see the image well/at all?
- I'm raelly bad at speling.

Approach #2

1. Start with a *task* computers **and** humans are good at.
2. Add *noise* to the given task

Guidelines

- **Accessibility**
- **Task Security; Even After Wide-Spread Adoption**
- **Script security**

Implementation (Earliest CAPTCHAs)

1. Starts with an image of a word
2. Distort it

Easy for humans. Hard for computers; AI wasn't good back then!

“ CAPTCHA tests are based on open problems in artificial intelligence (AI): decoding images of distorted text, for instance, is well beyond the capabilities of modern computers. Therefore, CAPTCHAs also offer well-defined challenges for the AI community, and induce security researchers, as well as otherwise malicious programmers, to work on advancing the field of AI. CAPTCHAs are thus a win-win situation: either a CAPTCHA is not broken and there is a way to differentiate humans from computers, or the CAPTCHA is broken and an AI problem is solved. ”

Initial Issues

- Hard to impossible for visually impaired users
- i18n
- More to come!



Sign up for your Yahoo! ID

[Help - Yahoo!](#)

Already have an ID? [Sign In](#)

Get a Yahoo! ID and password for free access to all personalized Yahoo! services.

Yahoo! ID:
(examples: "dairyman88" or "free2rhyme")

Password:

Re-type Password:

Choosing your ID
 You will use this information to access Yahoo! each time. Capitalization matters for your password!

If you forget your password, we would identify you with this information.

Security Question:

Your Answer:

Birthday: / / (Month Day, Year)

Alternate Email:

Recalling your password
 This is our only way to verify your identity. To protect your account, make sure "your answer" is **memorable for you but hard for others** to guess!

First Name: Last Name:

Language & Content:

Zip/Postal Code: Gender:

Industry:

Title:

Specialization:

Customizing Yahoo!
 Yahoo! will try to provide more relevant content and advertising based on the information collected on this page and on the Yahoo! products and services you use.

Send me special offers, promotions, and research surveys from selected Yahoo! partners through Yahoo! Delivers.

Interests (optional):

- Entertainment
- Home & Family
- Health
- Music
- Business
- Computers & Technology
- Personal Finance
- Small Business
- Shopping
- Sports & Outdoors
- Travel
- Sweepstakes & Free Stuff

Enter the word as it is shown in the box below.



Word Verification
 This step helps Yahoo! prevent automated registrations.
 If you can not see this image [click here](#).

By submitting your registration information, you indicate that you agree to the [Terms of Service](#) and have read and understand the [Yahoo! Privacy Policy](#). Your submission of this form will constitute your consent to the collection and use of this information and the transfer of this information to the United States or other countries for processing and storage by Yahoo! and its affiliates. You also agree to receive required administrative and legal notices such as this electronically.

Word verification technology developed in collaboration with the [Captcha Project](#) at [Carnegie Mellon University](#).

Yahoo adapts CAPTCHA (2002)

reCAPTCHA

What if we used CAPTCHA for good?



- One artificially warped word
- One unknown word from a book

Google: Don't be evil.

“ In 2009, Google acquired reCAPTCHA for an undisclosed amount (von Ahn says the sum was somewhere between \$10 million and \$100 million) and put the program to work on a tremendous scale, digitizing material for Google Books and the New York Times archives. In 2012, it was translating about 150 million distorted words a day. ”

The Battle: Bots vs CAPTCHAs

- AI advanced at a high rate.
- In 2014, at the highest difficulty, only 33% of humans got it right, compared to AI getting it correct 99.8%.

Make The Test

HARDER



Figure 4: Examples of images from the hard CAPTCHA puzzles dataset.

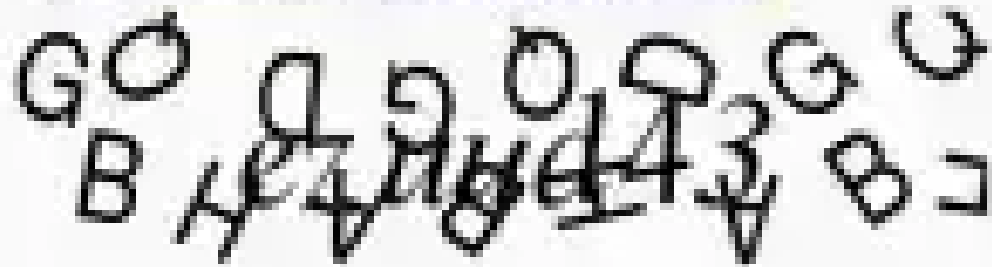
Remove Padding; Add Blobs

Make The Test

HARDER

Verification

[Try a new code](#) [Audio code](#) | [Help](#)



ezud43

Submit code



Make The Test

HARDER

User verification

Enter the word shown below

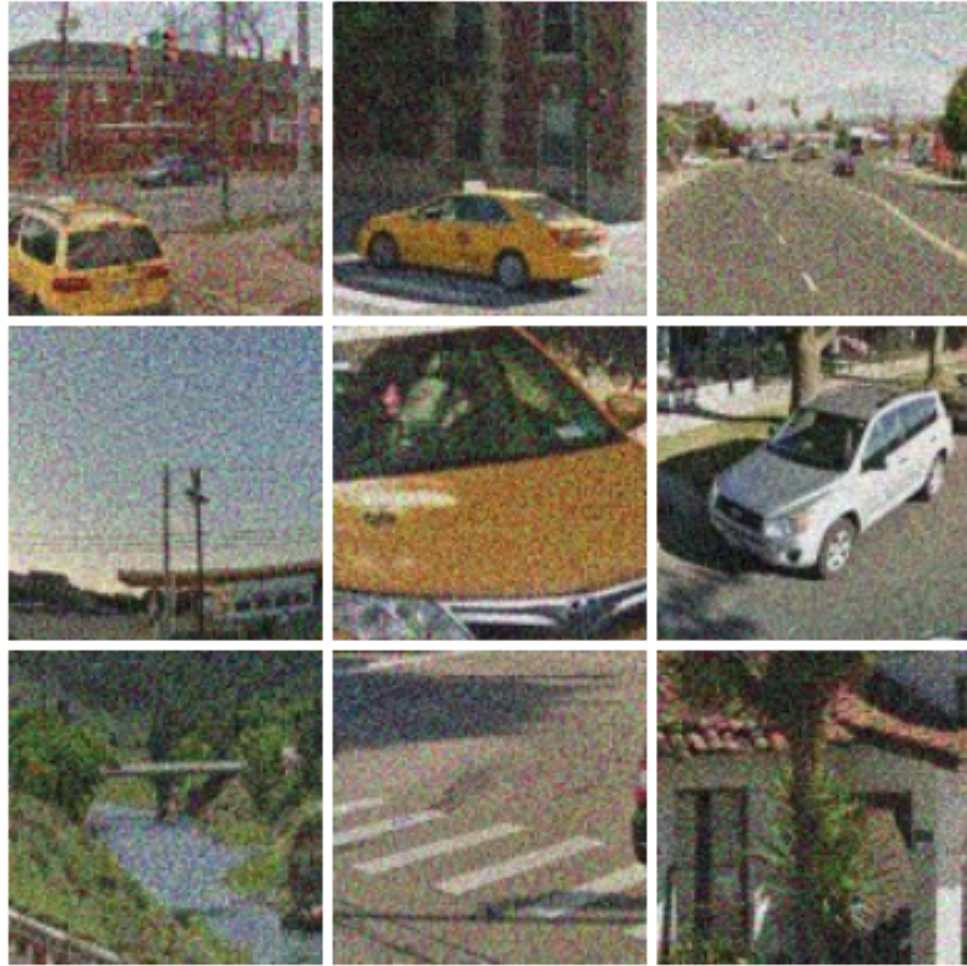


back to normal

pwease



Select all images with
taxi

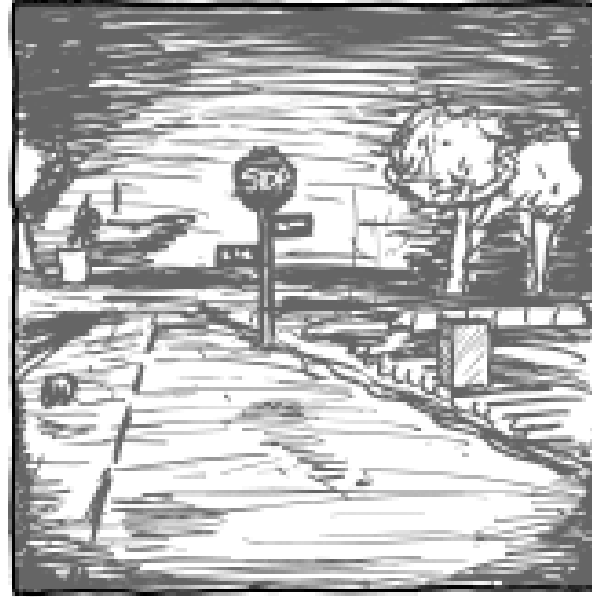


Images!!!!



VERIFY

TO COMPLETE YOUR REGISTRATION, PLEASE TELL US
WHETHER OR NOT THIS IMAGE CONTAINS A STOP SIGN:



NO YES

ANSWER QUICKLY—OUR SELF-DRIVING
CAR IS ALMOST AT THE INTERSECTION.

SO MUCH OF "AI" IS JUST FIGURING OUT WAYS
TO OFFLOAD WORK ONTO RANDOM STRANGERS.

...a bit harder?

Select all squares with

crosswalks

If there are none, click skip



...what?



SKIP

can we go back to text?

NOPE

Start a new application form

Please note that completion of this online form does not indicate that your Visa will be approved or issued by the Chinese Embassy or Consulate-General.



Start a new application form

Choose the option that best describes the dress length



Maxi



Mini



Midi

I don't know

Dress?????

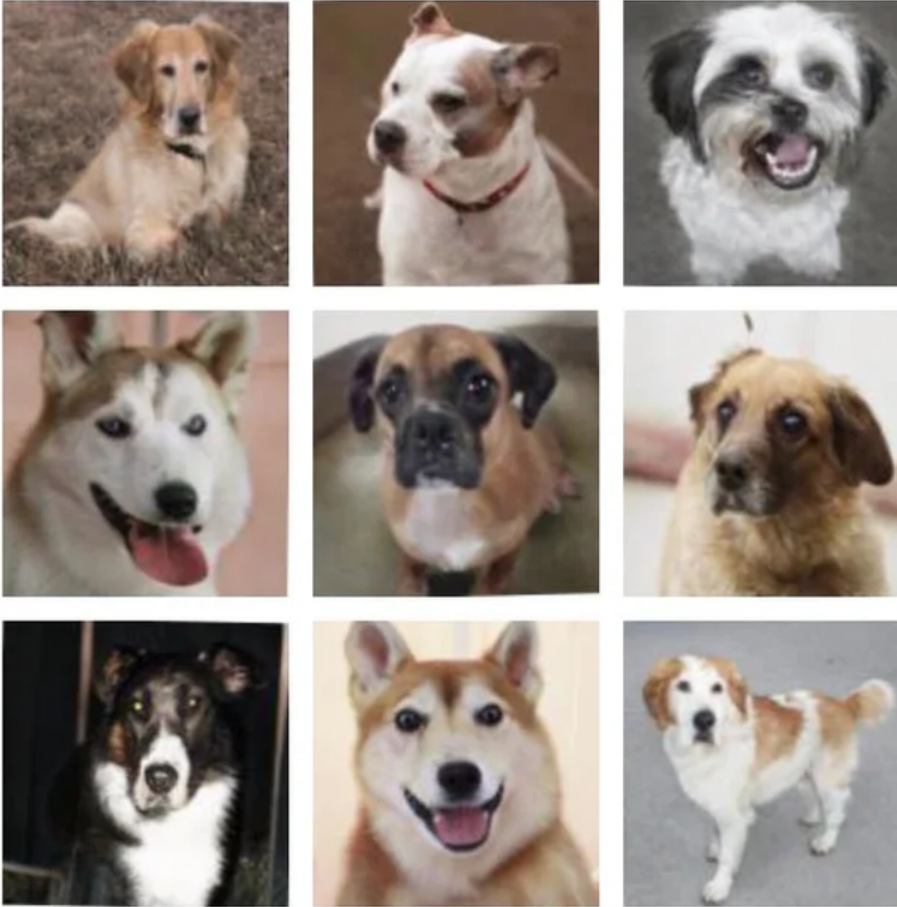


Check

SMILING?

Please click each image containing a smiling dog

If there are None, click Skip



EN

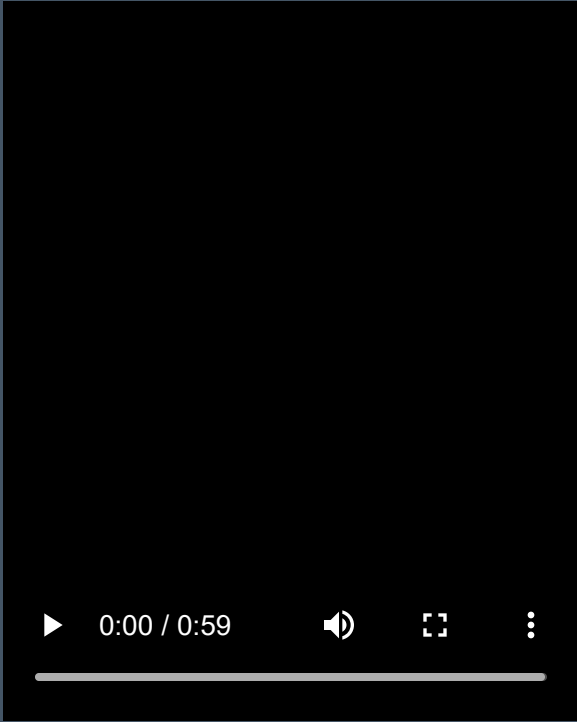
Please try again.

Skip

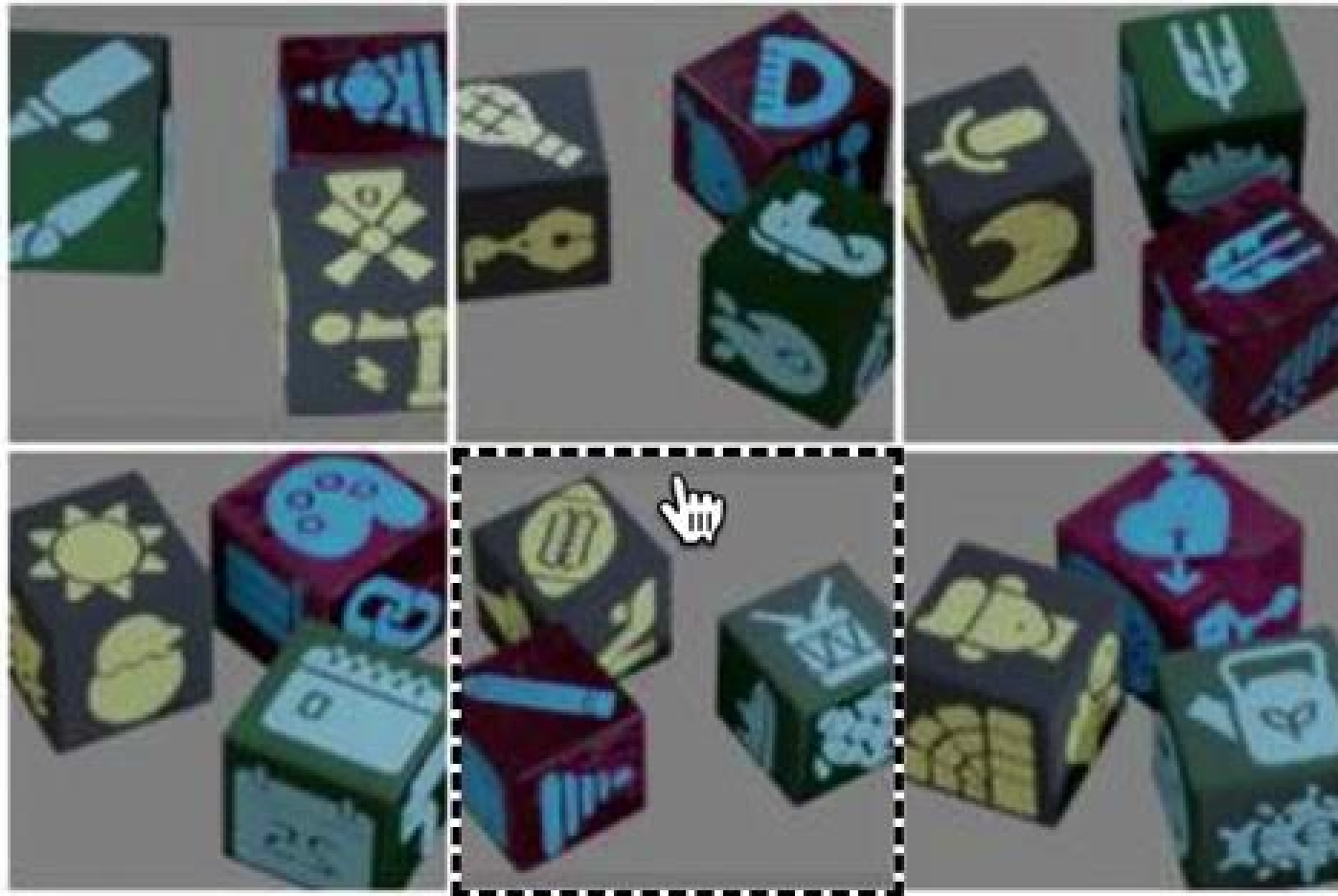
don't type

Type the two words:





Pick the dice pair with the same icon facing up



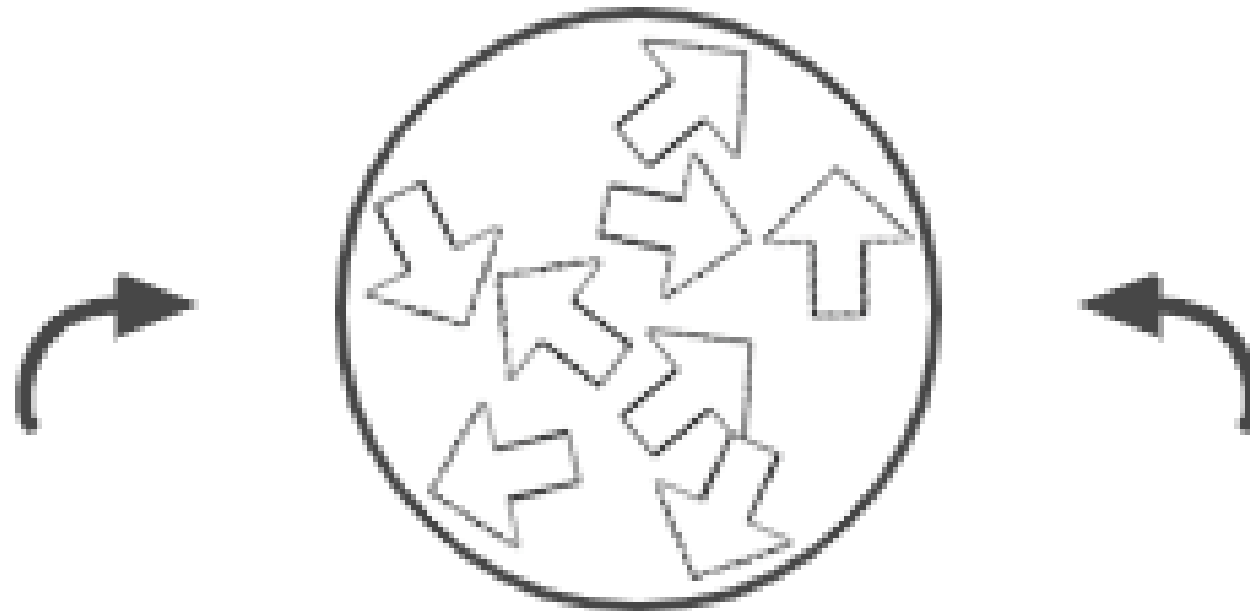


Is this a bird?
Answer with thumbs up or thumbs down
by rolling the ball!



Done

When exactly 2 arrows
are pointing directly up
touch Done!

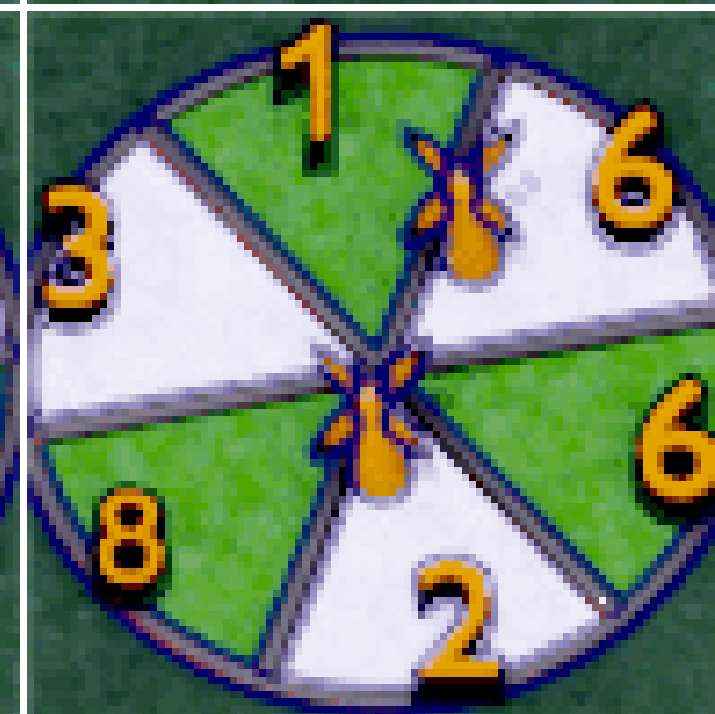


Done



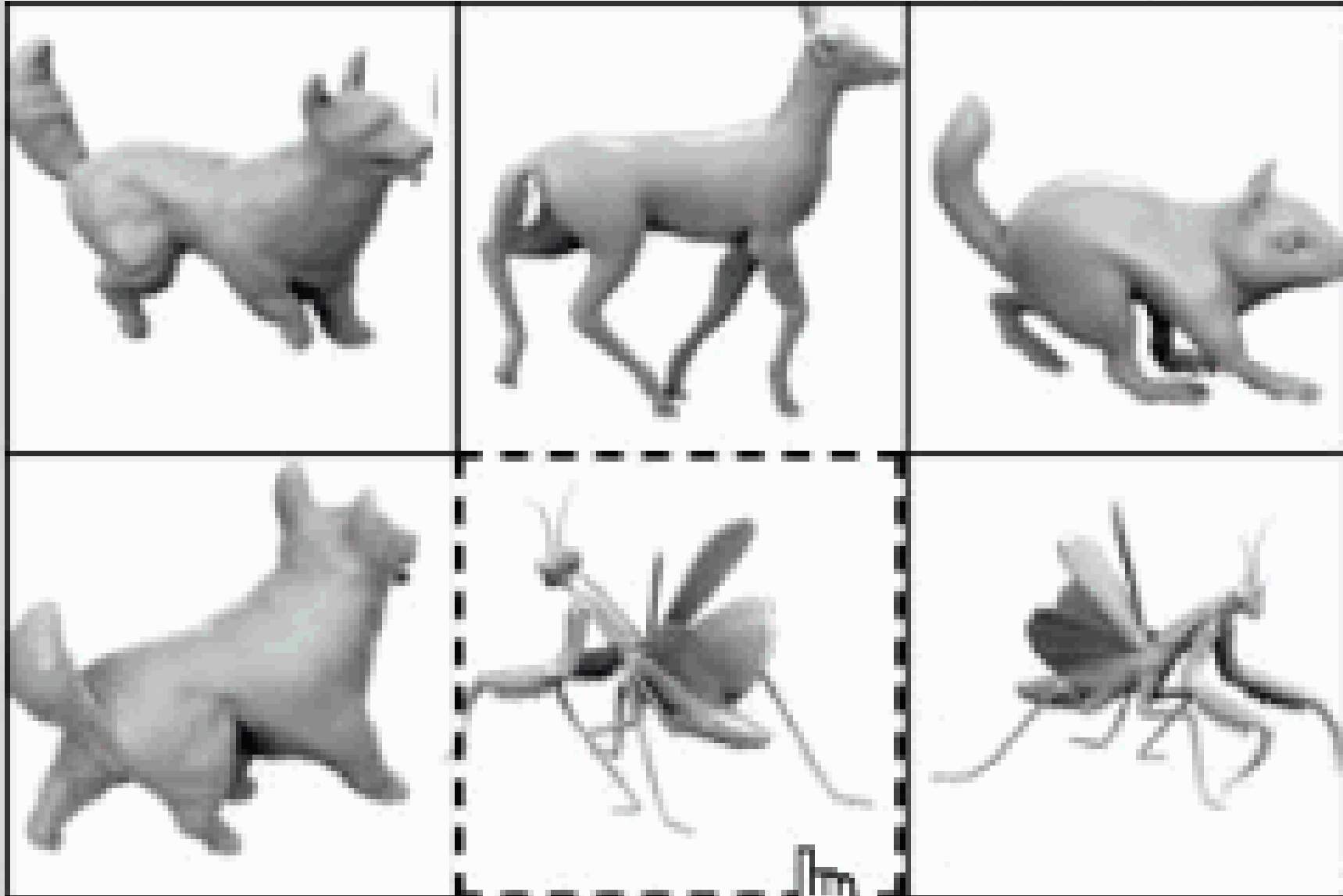
Select the animal with the wrong head

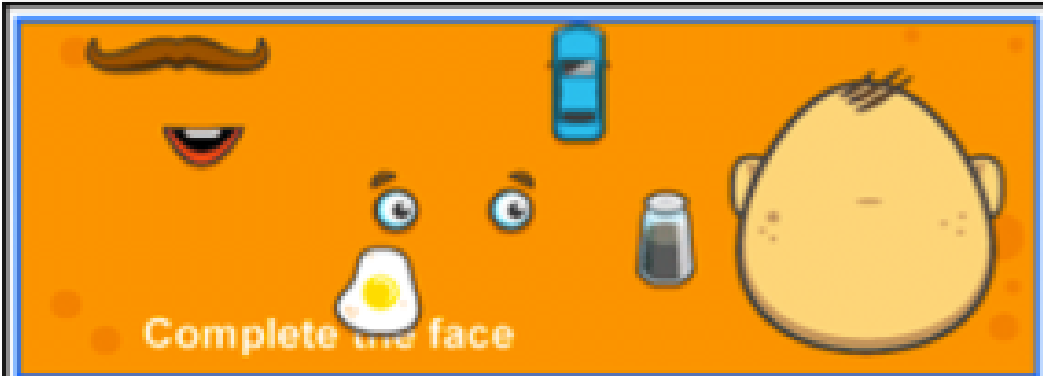




Pick the animal that is walking backwards

1 9 6 0 3 2 6 5 7 9 0 0 1 4 9 . 5 2 6 2 2 7 4 6 6 9





are you a human



are you a human



are you a human



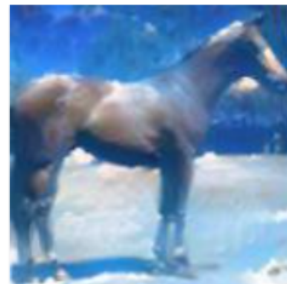
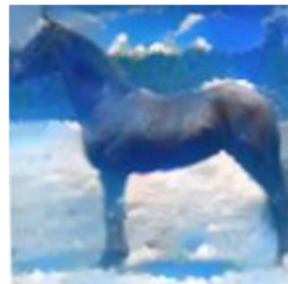
Touch the mouse that can't reach the cheese

1545f52a71356ca18.8656038105



Please click each image containing a horse made of clouds

If there are None, click Skip



EN



Skip

Qualifying question

Just to prove you are a human, please answer the following math challenge.

Q: Calculate:

$$\frac{\partial}{\partial x} \left[4 \cdot \sin \left(3 \cdot x - \frac{\pi}{2} \right) + 4 \cdot \cos (6 \cdot x) \right] \Big|_{x=0} .$$

A:

mandatory

Note: If you do not know the answer to this question, reload the page and you'll (probably) get another, easier, question.

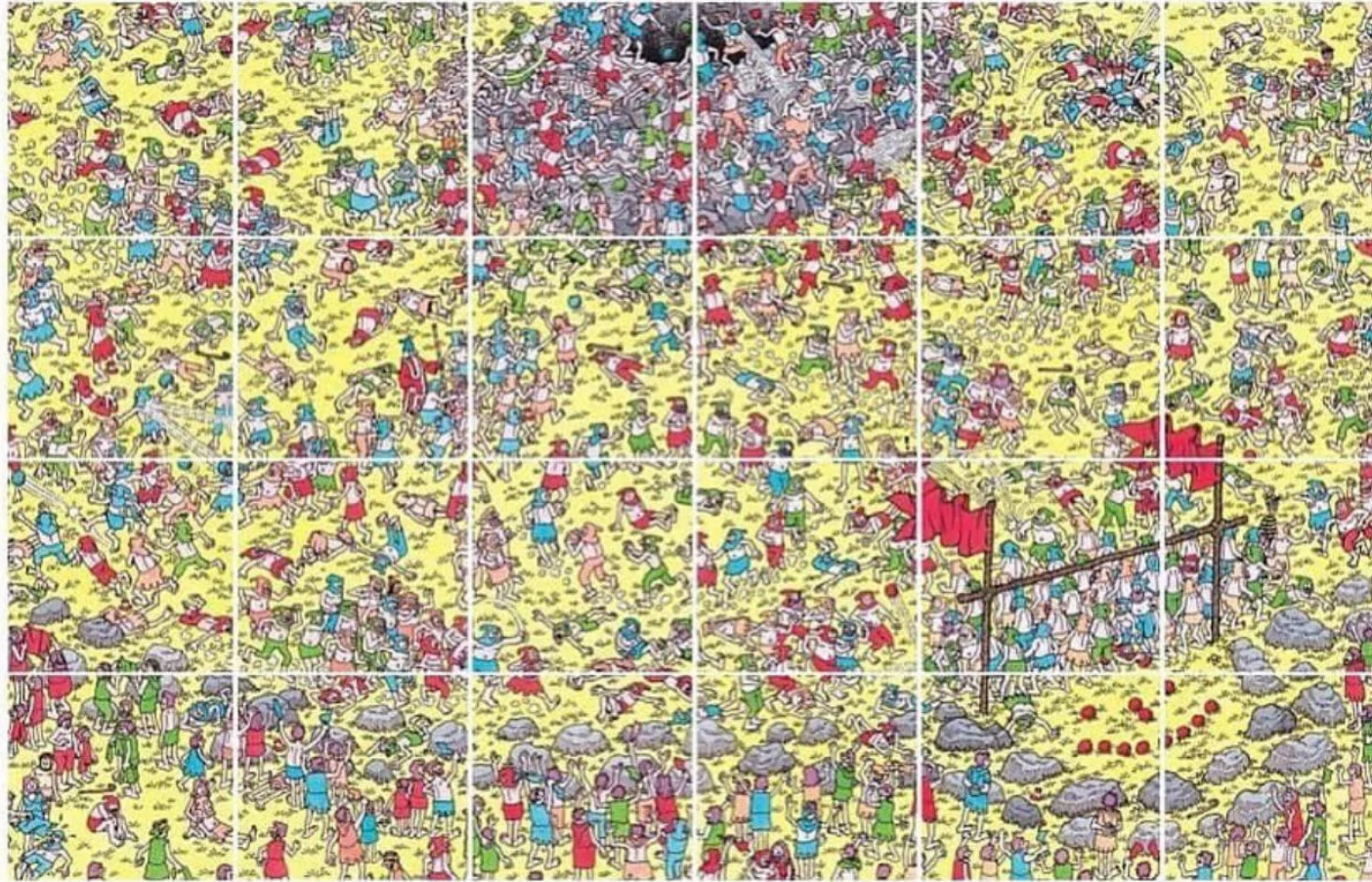
Your answer

What is the output of "date -u +%V\$(uname) | sha224sum | sed 's/\W//g'"?^{*}

Register

Select the square with Waldo

fuck you











VERIFY

AND YOU HAVE TO DO IT

FAST!!

Introducing: CAPTCHA Sweatshops

Captcha prices			
	Captcha type	Price per 1000	Solving speed
	Normal captcha	\$0.5 - \$1	⚡ 3 sec.
	reCAPTCHA V2	\$1 - \$2.99	⚡ 26 sec.
	reCAPTCHA V3	\$1.45 <small>score <= 0.3</small> \$2.99 <small>score > 0.3</small>	⚡ 6 sec.
	reCAPTCHA Enterprise	\$1 - \$2.99	⚡ 28 sec.
	hCaptcha	\$2.99	⚡ 20 sec.
	FunCaptcha	\$2.99	⚡ 11 sec.
	GeeTest CAPTCHA	\$2.99	⚡ 14 sec.
	KeyCAPTCHA	\$2.99	⚡ 12 sec.

Introducing: Pornography Attacks





reCAPTCHA solver: auto captcha bypass

Add to Chrome

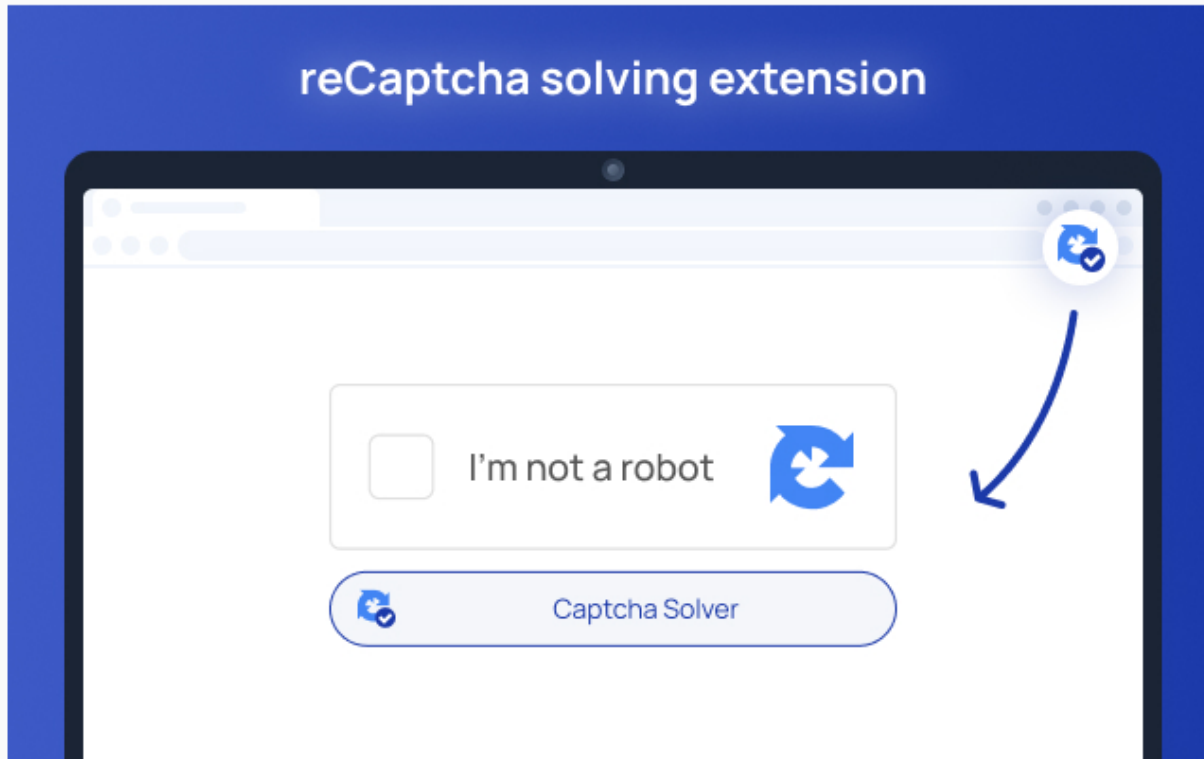
★★★★★ 58 ⓘ | [Accessibility](#) | 2,000+ users

Overview

Privacy practices

Reviews

Related



Solvers

I give up

Google please no

NOOOO!!!

reCAPTCHA v3

- Monitor mouse movement
- IP Activity
- Cookies
- Website behaviour
- Click speed

What are they training now?

Open source good alternatives?

- not really
- well
- maybe

Cryptography

- Hard puzzle that requires a CPU to solve
- Slow bots down, but slows everyone as well

Friendly CAPTCHA


Friendly Captcha

Privacy-First Bot Protection

Organizations—from startups to large enterprises—use Friendly Captcha to protect their websites and online services from spam and abuse. Friendly Captcha respects your user's privacy and works automatically, so your users don't have to do anything.


[Start now >](#)

[Try live demo >](#)

 I'm not a robot

[FriendlyCaptcha ↗](#)


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Europe


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Accessibility

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 class central

 IONOS

 DIE ZEIT

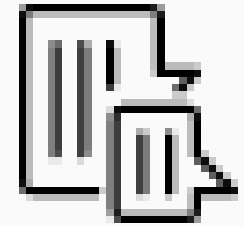
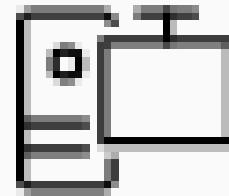
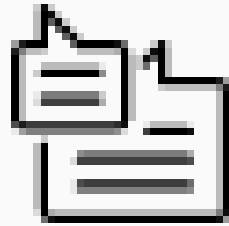
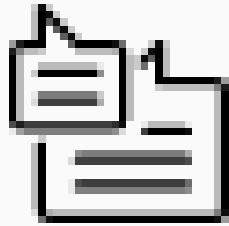
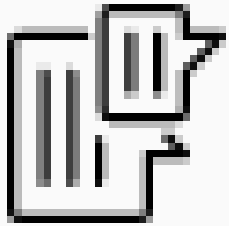
 zalando

 BIRKENSTOCK

 Red Cross

 ARD

Select the image displayed the least amount of times



ICONCAPTCHA ©

IconCAPTCHA

New CAPTCHA?

- Privacy-focused: ideally no tracking
- Secure: Cannot be bypassed
- Libre
- Drop in replacement
- Simple/Hidden UI
- Adaptive and flexible