

A sunny time project

Rediscover The Magic Of Time Through Sundials, The Ancestors Of Our Clocks

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Following their summer routine, Doraemon and Nobita were playing with their friends in the park when suddenly Shizuka remarked, "Hey guys! What about the summer project? Have you all started? We just have three more days." Nobita, who was clueless about the project, was woken from his slumber. He rushed home and took the assignment brief which read, "Make something which tells us the time." Nobita scratched his head. "We already have clocks. What else can tell time?" The only way out was taking help from Doraemon. So he rushed to Doraemon. "Sure, I'll help you but there is a catch - you will have to use your brain!" said Doraemon. To Nobita's surprise, Doraemon did not take out a gadget from his pocket but some tools - a simple wooden stick and a circular wooden block. Nobita was bewildered; he had no clue on how to use these two items



for his project.

At this point, the last hope Nobita had was his friend, Shizuka, who was an expert in the subject. They went to their favourite spot, the city playground, and started to ponder. Unfortunately, after hours of contemplation and recurrent failure, they both gave up. As Nobita got up to leave, he punched the wooden stick into the wooden block in frustration, and the stick turned slant, by nearly 60 degrees.

Shizuka noticed the altered structure and paid special attention to the shadow cast by

the stick under sunlight. She asked, "What time is it?" Nobita replied, "Around 12; let's go." Shizuka turned to him, "Look at the shadow of the wooden block." She then took a piece of chalk and marked a dot on the casted shadow. Another hour passed and they realised that the shadow moved to a different position. She again marked the spot and both of them waited till the sun was about to set. They found it similar to the working of a clock. And voila! The project was done.

On the day of submission, Nobita presented the summer project. "I have come up with something interesting for this project. All you need is three things - a wooden circular block surface, a wooden stick, and good sunlight. What you all see in front of you is a circular wooden block called the dial plate. The markings on its surface represent time. The numbered lines are called the hour lines, similar to a clock. And the wooden stick attached to the surface of a dial plate is known as gnomon. When you place this device under sunlight and the position of the sun changes, the shadow casted by the stick onto



The science of it

A sundial is a timekeeping device consisting of a flat circular surface or platform (dial) and a thin rod (gnomon) attached to it. The device shows the time as the sun moves across the sky and casts a shadow of the gnomon onto the platform, indicating the passage of time.

the wooden surface also changes, telling us the time. For example, when the sun is above our head, the shadow is casted on hour line 12 i.e., it is 12 pm and the shadow is shortest, but it keeps getting longer as time moves ahead. I would like to call this device Nobidial!" And with that, a huge round of applause resonated in the classroom. 🇮🇳

How to brew chaos

The Not-So-Legal DIY For Creating Encryption Keys

Mahi Modgil, AIS Gurugram 46, XII

This write-up is heavily inspired by Cloudflare, a corporation that uses lava lamps for internet encryption. Turns out, lava lamps are not just mere pieces of decoration or something to go "Ooooooo sooo pretty" at and then proceed to stare for six hours.

*Disclaimer: This DIY project can only be conducted by the multi-million dollar company that is Cloudflare Inc. Well, at least legally *winks*!*

Material required

- Lava lamps - 100
- Camera - 1
- Endless amount of computers
- A bucket load of randomness
- A dash of chaos
- A giant wall with shelves
- Cloudflare Inc (can easily be bought for 431 million USD at your nearest convenience store)

Knowledge required

- Randomness is essential for secure encryption. Each new key that a computer uses to encrypt data must be arbitrary, so that an attacker can't figure out the key and decrypt it. It's like creating a lock and throwing the key away in an endless ocean. Even finding a needle in a haystack is a metaphor too mild for it.
- The production of such unpredictable and chaotic data needs a source. The 'real world' turns out to be such a source because events in the physical world are erratic, volatile, and even fluctuating. In other words, it's perfect!
- Lava lamps are an excellent candidate for such unpredictability. They are the chosen ones, if you will. The 'lava' in these lava lamps never takes the same shape twice, which actually explains the 'ooh-ah' element we love reacting with. As a result, observing them is great for procuring absolutely random data, exactly what we want.



Procedure

- Take the lava lamps and arrange them on the shelves of a wall.
- Now, mount a camera to the wall in a way that it points at the lamps.
- Put on a timer, allowing the camera to take photos of your set lamps at assigned regular intervals.
- Once done, send the images to a computer server.
- Store all these digital images as a series

of numbers, with each pixel having its own numerical value. This way, each image would be a string of totally random numbers that the server can use as a starting point for generating secure encryption keys.

■ Congratulations! You have successfully copied Cloudflare's business model.

(Copyright claims might be issued, if you don't want to go to jail that is.)