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National Cyber Security Agency

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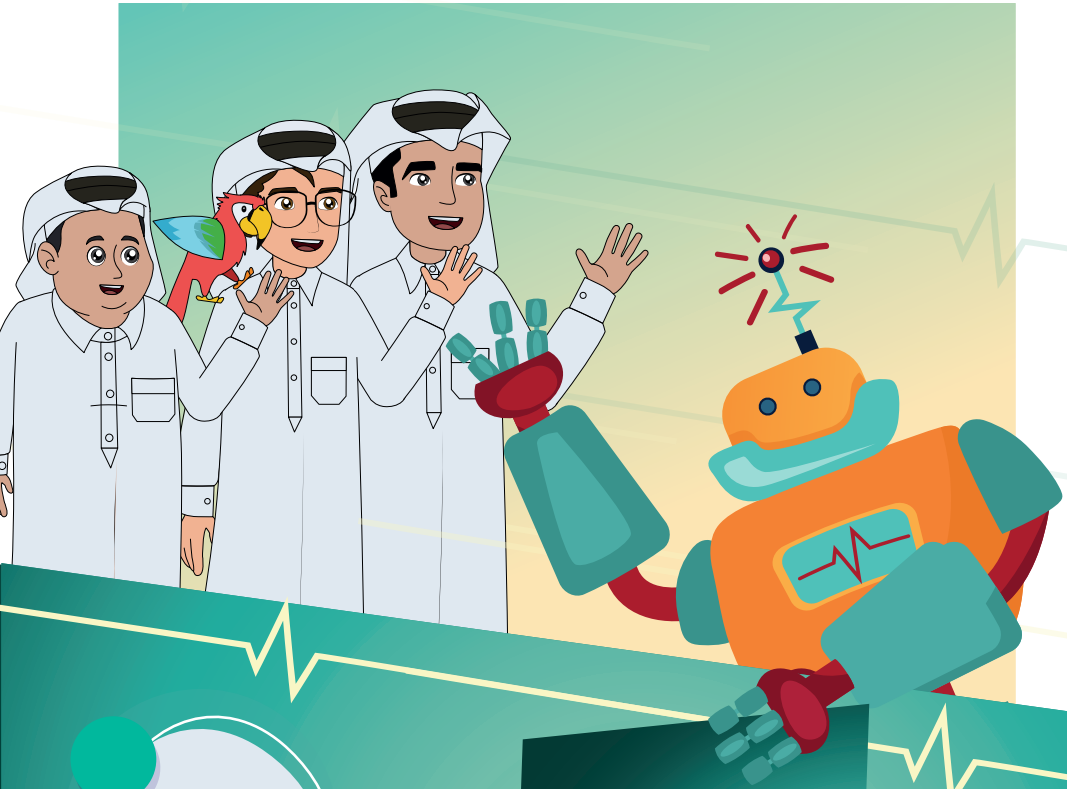

A short story
Ages 15-17

High School

Bots and Al-Khwarizmi's Team

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Al-Khwarizmi's Team

CyberEco

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December 2023

Doha, Qatar

This content is produced by the team of

National Cybersecurity Excellence Management, National Cyber Security Agency.

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Jassim

A high school student in the same class as Mohammed, he forms a great team with his friends (medium height with an oval face and curly black hair, slightly plump)

Mohammed, nicknamed " Al-Khwarizmi "

A high school student with a great passion for the world of artificial intelligence, and is also interested in the field of cybersecurity as a supporting area of his interests. (A seventeen-year-old young man, known among his friends as "The Algorithm", of medium height and size, with a small streak of white hair, white with brown hair and honey-colored eyes)

Khalifa

A high school student with a humorous personality, he forms a team with his friends filled with fun and camaraderie (medium height, slim body, with cascading black hair, thick wheat-colored eyebrows and a long, always smiling face)

Issa

A new high school student, the story begins with his introduction to his friends and his inclusion in the team by the teacher to prepare a research about network robots. (He has a round face, wheat-colored, of medium height and size, with thick long dark brown hair)

The teacher

A thirty-something young man, with a friendly relationship with his students, he assigns them research tasks that they find challenging but for their own benefit, and he is well-liked by his students. (A man in his mid-thirties, wearing glasses, known for his intelligence and wit, he is an important reference for the students)

The parrot

The parrot A large-sized bird with a big beak and a long tail, with beautiful colorful feathers, in a golden round cage.

In a not so distant time, between the aisles of a huge library, you will find him. You can hardly catch a glimpse of his unique digital watch as he flips through books and folders, searching eagerly for what he desires. He takes some books and carries them to his usual table in a quiet corner, focusing on reading and taking notes, until one feels that Mohammed is searching for himself or for a lost valuable truth.

Mohammed, a high school student, is calm and gentle, and has earned his name's ample share. He is known for his good manners and sincerity among his colleagues, relatives, and teachers. Perhaps he resembles someone you know, as he invests his time and effort in building something, or proving an unknown fact. He draws from a well of old and modern sciences, exploring and immersing himself in his experiments for hours, busy in his private room with a system that may surprise the observer compared to what he is used to seeing. If someone were to peek into his room while he is working, they would see many scattered small electronic components, which our friend quickly gathers as if he knows the exact place of each one. On the walls of his room, the viewer will notice pictures of ancient scientists, striking industrial designs, and a cage for his beloved friend, the parrot.

At the end of the day, Mohammed follows a specific schedule where he divides his time between school duties, pursuing his dreams and passions, and spending time with family and friends until sleep comes at night. He plans out his next day, how he will start and finish it. It's a new day, full of hope and ambitions, where Mohammed stands in front of his wide window, gazing at the sky. The cool morning breeze touches his cheeks, and it's as if he's waiting for a sign from the sky to begin a new search. He takes a deep breath and exhales slowly, then gently pets his parrot's feathers and leans in to touch its cage, nodding his head slightly. He checks the time and gets ready for school, full of optimism for a new day with his classmates and teachers.

As usual, classmates are in their computer class, with their beloved teacher. They discuss different topics and important references on a new subject. They plan to form unique teams, each consisting of 4 students, but after dividing into groups, the students realize that the last group only has 3 students.

Jasim jokes, "That's not fair!"

Then Khalifa says, "Come on, guys, we have Al-Khwarizmi. He's worth two of us with his intelligence." Laughter fills the room, but **the teacher interrupts with a smile, saying,** "Didn't I tell you that I have a surprise for you? One of the well-known students for his hard work and intelligence will be joining your class today due to a change in his residential area."

The classmates turn to each other in surprise and silence, until there's a knock on the door.

A new student stands at the door, with signs of intelligence on his face. The teacher invites him in and introduces him to his classmates, who welcome him warmly. Khalifa says, "Now our team is complete."

Issa, the new student with long brown hair and wide eyes, finds a seat and Mohammed makes room for him next to him. With a smile and a warm welcome, the team is now made up of four students. Their research assignment for the week, as explained by their teacher, is to research internet robots and discover their secrets and history, and present it **as a summary on internet robots.** The students eagerly accept their assignment and their brains start working on how to fulfill their roles in the research, fact-checking, and writing. They are so immersed in their task that they only stop when the bell rings, signaling the end of class. The teacher bids them farewell, hoping their efforts will bring them joy and knowledge, and looks forward to seeing them next week at the same time.

In the courtyard, the four students hovered together, chatting and exchanging ideas while getting to know their new classmate. Issa expressed his gratitude for their help, but was intrigued by Mohammed's peculiar nickname. Jassim revealed the secret behind Mohammed's nickname, explaining that it stemmed from Mohammed's profound interest in artificial intelligence and information technology since childhood. One of their teachers bestowed upon him the nickname "Al-Khwarizmi," in reference to the Arab mathematician Mohammed ibn Musa al-Khwarizmi, who pioneered the field of algebra and algorithms. These algorithms are widely relied upon in computer science and robotics.

The classmates concluded another enjoyable day at school, where they learned more about robots and computer science. They even discussed the history of robots, which originated as a science fiction concept in a story by the Russian-American writer Isaac Asimov in the mid-20th century (1942 AD). They discussed the three laws that robots adhered to at the time, which focused on not harming humans, serving them diligently, and protecting humans without causing harm to others. They also discovered that the word "robot" originated from the Czech word "robota," which means labor or hard work. Amidst their conversation, the classmates agreed to visit Mohammed's house the following afternoon to organize the information they had gathered for their research.

On the spacious balcony of Mohammed's room, the classmates earnestly shared their ideas with each other, demonstrating a sense of responsibility and commitment to their tasks. Unbeknownst to them, their friends paid attention to their remarks. They meticulously cross-checked their information from reliable sources on the Internet, eliminating duplications and inconsistencies, and created a concise index of the ideas they would discuss, organized according to the research's context.

The internet bots themselves are abbreviated as "bots" or "web crawlers," and in other contexts, they are known as "web robots." The subject intrigued them, arousing their curiosity and enthusiasm for further exploration. Although they are not creatures that mimic humans and perform predetermined mechanical tasks, they are programs that typically simulate human behavior and can even replace humans. However, they are much faster than human users because they operate mechanically. Examples of tasks that bots can perform include customer service and search engine indexing.


Khwarizmi .. Khwarizmi .. Robot

What a coincidence! The parrot friend hangs itself upside down, expressing its happiness with the presence of companions, and repeats aloud: " Khwarizmi .. Khwarizmi .. Robot." Our friends laugh at its action for a while, then return to their own concerns. However, this parrot's imitation of some words spoken by humans and repeating them repeatedly is similar to what robots do.

Some people may be confused about the nature of bots and whether they are helpful or harmful. Like other technologies, they can be used for beneficial or harmful purposes, depending on the intentions of the user. Harmful robots are used by attackers to gain full control over the victim's device and carry out tasks that damage the targeted electronic devices. They are known as malware, which can be exploited in attacks or used to send random messages, spy, disrupt business operations, attack any website regardless of its size, steal data, commit fraud, and launch denial-of-service attacks. Considering the difference between computer bots and internet bots, both are digital tools that can be used for good or bad purposes.

Executing these attacks and hiding the source of the attack's movement drives attackers to distribute harmful bots within a larger framework called a botnet. This means a network of bots. As for the internet bot, it represents a number of interconnected devices, each of which operates one or more bots, usually without the knowledge of the device owners. Each device has its own IP address, and this increases the difficulty of determining the source of the harmful bot.

Furthermore, combating them is also difficult. Internet bots are capable of expanding and growing by using devices to send random emails, which can infect a larger number of different devices.

One of the common ways that bots can infect a computer is through downloading and installing malicious software and applications. Malicious software is placed on the user's device in a file that is downloaded via a social network or email message that advises to open a certain link, which is usually an image or a video clip containing either viruses or other harmful software. If the device is infected with malicious software, this may be part of a botnet.

The bot may appear in a warning message informing the user that their device will be infected with a virus if they do not open a specific link. However, the truth is that clicking on the link is precisely what infects the device with a virus.

The operation of internet bots is highly detrimental, as it not only targets individuals but also companies. Malicious bots can cause problems and disruptions for companies. As for individual customers, these issues manifest in identity and data theft, keylogging, and obtaining sensitive information such as passwords, banking information, or credit card data, and even phishing attempts.

The complexity of malicious bots lies in their ability to easily go unnoticed, as they hide within the computer, often disguised with file names and processes that are similar or identical to regular system files or common files. Examples of malicious bots include spam bots.

Spam bots intersect in their activity with unsolicited spam messages that reach a large number of people without their consent. These spam bots can acquire email addresses from social media pages or guestbooks and can publish promotional content in forums or comments to increase traffic to specific websites.

Another type of malicious bot is chatbots. Online dating websites and applications are an ideal space for harmful chatbots. These bots pretend to be real personalities and mimic human responses. They often succeed in deceiving individuals who are unaware that they are conversing with malicious software. The aim is to obtain personal information, such as credit card numbers, from unsuspecting users.

File-sharing bots are also considered malicious bots. These bots obtain user queries and questions (such as the latest movie from your favorite artist) and respond to the search by claiming that the file is ready for download, providing a link. When the user clicks on the link to download the video, their device becomes infected with malware.

Our friends take a break for some tea, while Issa looks around at the pictures and paintings hanging on the walls. He approaches the parrot's cage, and the parrot lightly dances, expressing its welcome.

"Everything is unique in Mohammed's room. Was Al-Khwarizmi's room this organized?" Isa wonders to himself, with a smile of joy and happiness with his new companions.

There are also additional examples of malicious bots that insert credential information by entering usernames and passwords, which are obtained from data breaches on login pages online in order to gain unauthorized access to user accounts.

There are also other types of bots that work to increase their activity intensively in order to flood the server's resources and prevent the service from functioning properly. These are called denial of service attack bots. As for bots that open shopping carts on a specific online store and select items from that store and add them to the cart without completing the process, they carry out what is known as inventory denial attacks, where the real user will receive a message indicating that the item is out of stock even though it is still available.

As for vulnerability scanners, they are bots that scan millions of websites and inform the website owners of any vulnerabilities. Malicious bots, on the other hand, are specifically designed to inform only one person who is involved in selling or using this information to breach websites.

It is also worth mentioning another type of malicious bots, which are click fraud bots, which generate a huge amount of fraudulent traffic. They specifically target paid advertisements for participation in fraudulent advertisements. This non-human traffic costs advertisers a lot of money each year, as the activities of these bots are hidden as legitimate visits, especially if there is no good and effective program to detect malicious bots. There are also robots used to monitor activity and carry out large-scale data theft operations, as well as to increase the load on mail servers.

The Khwarizmi and his friends notice that most of the time has passed, and they have completed the majority of their research. The sunset scene is unfolding, as the sun proudly wraps up its robes, bidding farewell to its usual resting place at the end of each day. The night spreads its calm, gradually cutting off the lights and noise of life, guiding the tired to rest and stability. Oh, the pleasure of the tiredness that leads one to their desired goal! That voluntary pursuit that is mixed with the taste of pleasure. Passion, combined with determination and willpower, is the fuel for creativity and innovation in all eras, like the Khwarizmi, who worked in his youth at the House of Wisdom under the rule of the Abbasid caliph Al-Ma'mun, leaving a great impact on the flourishing of sciences at the time. He introduced Western civilization to Arabic numerals and invented the concept of zero, and made many improvements to the theory and construction of sundials. He excelled in the fields of algebra, cryptography, astronomy, and geography, leaving exceptional marks on the world and authoring several books that guide those who are passionate after him to research and achieve their goals.

Our friend Mohammed says: "Now we can summarize the motives behind the use of bots by cybercriminals, where they use them to steal financial and personal information or to attack legitimate online services, resulting in the disruption of network services, extortion and theft of money, in addition to cybercrimes that rely on malicious bots to send spam, deceptive messages, phishing attacks, or identity theft and attacks on real websites and networks."

Issa: "We must also mention some types of bots used for beneficial purposes, or do you disagree, my friends?"

The companions nod their heads in agreement, and **Mohammed says,** "Yes, of course. Who would like to conclude the paragraph?"

Jassem: "I believe I can do that. Let me tell you about some other uses for beneficial bots."

Khalifa says with a smile, "We are all listening."

Jassem: There are chat bots, as well as group bots used to automatically create messages and advocate certain ideas and act as followers for users, as well as to increase social network accounts and increase their complexity. It becomes more difficult to create fake accounts for social bots, making it difficult to identify them as they can exhibit similar behavior to real users.

And there are store bots used to get the best prices for products that the user is searching for, and web crawlers or network reptiles that help Google and other search engines understand the best way to respond to user queries.

And content bots, which are bots that read data from websites with the goal of saving it for offline use and enabling it to be reused. Data collectors for the benefit of users by automatically visiting websites to retrieve information that answers specific questions.

And website health monitoring bots, and transaction bots that complete transactions on behalf of humans, allowing customers to conduct transactions in a conversational context. And other bots used for automatically downloading software or phone applications, and bots that automatically purchase tickets for famous events with the aim of reselling them for profit.

Khalifa: "I think we have covered the main points of our research, now we must choose or design images that are suitable for the bots.

Our friends Jassem, Mohammed, and Isa all expressed their agreement and support for what their friend had brought up. However, it is necessary for anyone who borrows to seek permission from the owners of the images before using them, or to credit the original image source, or to purchase them directly from the designer, as these works are intellectual and creative property that must be attributed to their owners. Can our friends imagine the achievements of our Muslim scientist Al-Khwarizmi and his inventions being attributed to someone else, depriving him of his rights and giving credit for his work to someone else? Would this not lead to the loss of the Islamic civilization among other civilizations?

This falls under the topic of copyright and printing rights for all creative works, including images, videos, writings, and others. It is necessary to credit the source of the images and request permission from the owner.

The companions bid farewell to their friend Mohammed and thanked him for hosting them to complete their research. They did not forget their beloved parrot friend, who continued to repeat the words they had shared, adding a touch of humor and lively breaks for our friends during their work.

Today is the long-awaited day to present our research to our classmates and teacher. The students were ready to answer the teacher's questions about their research on a day filled with excitement, as the sun rose to light up the earth and wake up those who were sleeping with its rays sneaking through the windows and stirring the leaves on the balconies, causing drops of dew to fly. The parrot woke up early, dancing with joy to wake up his owner Mohammed with the sound of his wings hitting the edges of his golden cage, and the clock indicated the daily wake-up time, but it was an important day that the students eagerly awaited, as they were determined to achieve their goals and reap the rewards of their hard work and perseverance. They were used to constructive competition, which creates stronger and more capable versions of themselves, preparing them to become responsible and conscious individuals, who know how to utilize the available resources and capabilities for maximum benefit. This is especially evident in the field of technology and modern networks, where countries are progressing by utilizing these means to build and elevate their civilizations, while the members of their societies possess the necessary awareness to protect against potential risks and handle challenges using preventive and corrective strategies.

In their information technology class, the teacher entered the classroom, and each student awaited their turn to explain and discuss their ideas about their research topic. At the end of the lesson, the teacher praised the students' efforts and their serious approach to their assignments, as their research was exceptional, comprehensive in its knowledge, and organized in its ideas. They deservedly received high grades.

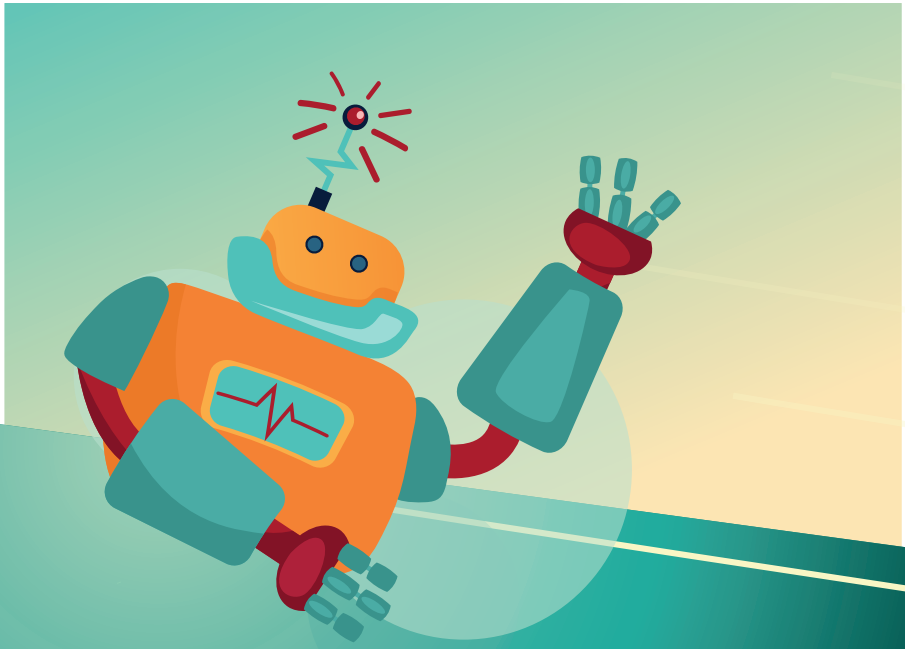
The students were happy with their grades, but their success was not limited to their grades alone, as it was the result of their collaboration as a team. This is what Isa, the new student, experienced, as it was his first valuable experience, and he quickly felt a sense of belonging to his classmates. As for Jassem, he asked his friend Mohammed for a plan to design a simple robot, hoping to learn some basic skills to keep up with the rapid development in the field of artificial intelligence. He had received a book in English on artificial intelligence a few days ago as a gift, and he was planning to share it with his friend Al-Khwarizmi.

Khalifa was happy to have a beautiful parrot like the one in Mohammed's room, so Mohammed showed him the place where he had purchased the bird, and he even told him that he would accompany him to the market to buy one.

Mohammed tried to come up with a new algorithm to design several simple homemade robots, each of which would be named after one of his friends. There was the Khalifa robot, the Jassem robot, and the extra robot named Isa. Perhaps the parrot would be the most successful of these robots, as it would repeat some of the words it heard.

"Bots and Al-Khwarizmi team" was the title of their research, and Al-Khwarizmi's algorithms were the starting point for many global inventions that have changed the face of the world in all its economic, social, and environmental aspects. It is impossible for a wise person to isolate himself from all these advancements, and this is the practice of advanced societies, as they invest in their people to empower them, enhance their capabilities, and educate them about the risks and challenges of cybersecurity.

Even humans themselves can use their knowledge for good or harm, as demonstrated by the research on robots. As much as they save time and effort for humans, if used for harm, they can ruin many of their actions, hinder their progress, and prevent them from moving forward. Our Muslim scientist Al-Khwarizmi is quoted as saying, "I have not seen a teacher who teaches better than time, and I have not seen a student who learns worse than humans."



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