Prof. Christos/ Theory

What is a decision problem?

A decision problem is an algorithm or repetitive procedure that gives a definite answer, "yes" or "no" to mathematical and formal logic problems.

What does it mean for a decision problem to be decidable?

It means that it’s possible to create an algorithm or efficient to solve it.

What is the class P? What is the class NP?

P is the set of languages for which there exists an efficient certifier that ignores the certificate.

The class NP is the set of languages for which there exists an efficient certifier.

A problem is in P if we can decide them in polynomial time (can be solved by computer). It is in NP if we can decide them in polynomial time if we are given the right certificate.

What is the intuitive meaning of the “P versus NP” question?

The intuitive meaning is that if P=NP. Whether every NP problem is also a P problem.

If you resolve the P versus NP question, how much richer will you be?

If I resolve the P versus NP question, I will get one million dollars from the Clay Mathematics Institute in Cambridge, MA.

---------------------------------------------------------------------------------

Prof Riley/Security:

Research two major computer security incidents that have happened in Qatar.  For each, describe....

Qatar National Bank Cyber Attack

What did attackers break into?

The attackers broke into the information systems of the Qatar National Bank.

How did the attackers break into it?

According to cyber security expert Simon Edwards from Trend Micro, “the attackers managed to obtain the data with an SQL injection attack, this gave them a large backup file containing the data they were after. Using an open source SQL injection tool they were able to extract all of the customer data they needed.

Who was impacted?

The information of more than 1,200 individuals and organizations was leaked, including Al Jazeera journalists, members of the country's Secret Service, security agencies and even members of the ruling Al Thani family.

How was it investigated?

Qatar National Bank refused to say whether the leak had occured, but said it was looking into the claims.

Turkish hackers claim responsibility for Qatar National Bank information leak.

Qatar State News Agency website hacked during diplomatic crisis

What did attackers break into?

Attackers break into Qatar State News Agency and government social media accounts。

How did the attackers break into it?

A fictitious Emirati company based in Azerbaijan asked three Turkish companies, which work on securing online platforms and websites, to detect security breaches in a list of online news websites including QNA. They offered to provide solutions to protect these websites against the security breaches.According to the investigation, the UAE-owned company ended its operation in Azerbaijan as soon as the data became available to it. The information was then handed over to the Saudi hacking team.

Who was impacted?

The whole of Qatar is affected. Hackers posted false statements attributed to Sheikh Tamim on QNA's platform, triggering a major diplomatic crisis.

How was it investigated?

Both Al Jazeera and Qatari authorities have conducted investigations.

---------------------------------------------------------------------------------

Prof Hammoud/Cloud Computing:

What is Big Data?

Big data is defined as the inclusion of more varied, ever-increasing, and faster data.

It’s larger, more complex datasets, especially data from new data sources, which are so large that traditional data processing software cannot manage them. But this massive amount of data can be used to solve business problems that you couldn't solve before.

What is cloud computing?

Cloud computing is the provision of computing services (including servers, storage, databases, networking, software, analytics, and intelligence) over the Internet ("cloud") to provide faster innovation, flexible resources, and economies of scale.

Is cloud computing a novel technology per se or an amalgamation of several traditional technologies?

Cloud computing is a next-generation technology.

What are the 3 major cloud computing service models?

The 3 major cloud computing service models are infrastructure as a service (IaaS), platform as a service (PaaS) and software as a service (SaaS).

Name at least 3 real-life problems that cloud computing can help solve them.

Man-made and natural disasters that damage equipment, shut down power and incapacitate critical IT functions.

Huge storage cost.

Difficulty cooperating when members are not together.

What is the economic/business model of cloud computing?

The cloud sells IT infrastructure, platforms, and applications as a service. Its on-demand "pay-as-you-go" model reduces the time, money and labor required to build and deploy infrastructure and applications.

Resources:

<https://www.cs.cmu.edu/~ckingsf/bioinfo-lectures/np.pdf>

<https://www.technologyreview.com/2010/08/19/262224/what-does-p-vs-np-mean-for-the-rest-of-us/>

<https://www.itp.net/security/607376-qatar-national-bank-admits-data-breach>

<https://www.aljazeera.com/news/2018/6/4/qatar-state-news-agencys-hacking-linked-to-riyadh>

<https://www.aljazeera.net/news/arabic/2018/6/3/%D8%AA%D8%AD%D9%82%D9%8A%D9%82-%D9%84%D9%84%D8%AC%D8%B2%D9%8A%D8%B1%D8%A9-%D9%82%D8%B1%D8%B5%D9%86%D8%A9-%D9%82%D9%86%D8%A7-%D8%AA%D9%85%D8%AA-%D9%85%D9%86-%D9%88%D8%B2%D8%A7%D8%B1%D8%A9>

<https://www.oracle.com/big-data/what-is-big-data/>

<https://azure.microsoft.com/en-us/resources/cloud-computing-dictionary/what-is-cloud-computing/#benefits>

<https://blog.leaseweb.com/2018/03/20/15-business-problems-that-can-be-solved-by-moving-to-the-cloud/>