1. DESCRIBE THE FOUR INDUSTRIAL REVOLUTIONS. EXPLAIN THE VARIOUS RISKS THAT THIS FOURTH INDUSTRIAL REVOLUTION ENTAILS.

So, the first industrial revolution is when we discovered how to fully harness the power of steam. Then, for the second industrial revolution, we worked out how to mass-produce products using electricity. And then we have the third industrial revolution where we discovered digital computers in the 1970s. Right now, we're going through a fourth industrial revolution that is very different from the previous industrial revolutions because we're well on the way to developing the ability to design and engineer the world around us using the very atoms and molecules it's made of. And what makes this revolution so mind-boggling is the way that we're vastly enhancing this mastery of living and non-living stuff with an incredibly powerful secret sauce called "cyberspace".

Risks : If we're not careful, a lot of people could get hurt in this revolution by losing their job, their rights or even their lives.

2. WHAT ARE SMART FACTORIES? WHAT DO THEY CONSIST OF? WHAT ARE THE ADVANTAGES OF SMART FACTORIES FOR THE INDUSTRY?

In smart factories, machines and products communicate with each other in an Internet of Things, cooperatively driving production. (Demander à la prof ce qu'elle veut comme réponse pour « What do they consist of ? »

Advantages : There are autocratic, independently operating systems which self-optimize, communicate with each other, and optimize production as a whole. So, for the customer this means tailor-made products at relatively affordable prices. For industry, it means highly flexible mass production that can be rapidly adapted to market changes because in the future product life cycles will be even shorter.

3. DESCRIBE THE VARIOUS ISSUES FACING IOT REGARDING SECURITY AND PRIVACY.+ DESCRIBE AN EXAMPLE TO PROVE YOUR POINT.

Due to its expanded attack surface, IoT security and IoT privacy are cited as major concerns :

-   Because IoT devices are closely connected, all a hacker has to do is exploit one vulnerability to manipulate all the data, rendering it unusable. And manufacturers that don't update their devices regularly -- or at all -- leave them vulnerable to cybercriminals.
-   Additionally, connected devices often ask users to input their personal information, including names, ages, addresses, phone numbers and even social media accounts -- information that's invaluable to hackers.
-   Privacy is another major concern for IoT users. For instance, companies that make and distribute consumer IoT devices could use those devices to obtain and sell users' personal data.
-   Beyond leaking personal data, IoT poses a risk to critical infrastructure, including electricity, transportation, and financial services.

4. HOW CAN AI BE CATEGORIZED? SELECT AND DESCRIBE ONE WAY.

One way to categorize AI is to classify AI systems as either weak AI or strong AI. Weak AI, also known as narrow AI, is an AI system that is designed and trained for a particular task. Virtual personal assistants, such as Apple's Siri, are a form of weak AI.

Strong AI, also known as artificial general intelligence, is an AI system with generalized human cognitive abilities so that when presented with an unfamiliar task, it has enough intelligence to find a solution. The

Turing Test, developed by mathematician Alan Turing in 1950, is a method used to determine if a computer can actually think like a human, although the method is controversial.

5. DESCRIBE 2 ARGUMENTS IN FAVOUR AND 2 ARGUMENTS AGAINST SMART CITIES.

Advantages : could help to improve traffic, reduce criminality (call police by itself)

Drawbacks : state can spy personal info, expensive and it pollutes

6. SELECT AND DESCRIBE 2 EXAMPLES/APPLICATIONS LEVERAGING ONE OF THESE SUBFIELDS OF AI: COMPUTER VISION/NEURAL NETWORK/NATURAL LANGUAGE PROCESSING/COGNITIVE COMPUTING

Natural language processing : automatic translator, personal advise

7. SELECT AND DESCRIBE 2 INTERESTING APPLICATIONS OF MACHINE LEARNING OR DEEP LEARNING.

An App that beat the GO Champion, Tesla Drive

8. SELECT AND DESCRIBE 2 EXAMPLES OF BIASES IN AI.

Ads, recruitment sexism

9. EXPLAIN THE 5 V'S OF BIG DATA.

The 5 V's of Big Data are : Volume, Velocity, Variety, Veracity and Value.

1) Volume:
It refers to the size of Big Data. Data can be considered Big Data or not is based on the volume. The rapidly increasing volume data is due to cloud-computing traffic, IoT, mobile traffic etc.

2) Velocity
It refers to the speed at which the data is getting accumulated. This is mainly due to IoTs, mobile data, social media etc.

3) Variety
It refers to Structured, Semi-structured and Unstructured data due to different sources of data generated either by humans or by machines.

Structured data: It's the traditional data which is organized and conforms to the formal structure of data. This data can be stored in a relational database. Example: Bank statement containing date, time, amount etc.

Semi-structured data: It's semi-organized data. It doesn't conform to the formal structure of data. Example: Log files, JSON files, Sensor data, csv files etc.

Unstructured data: It's not an organized data and doesn't fit into rows and columns structure of a relational database. Example: Text files, Emails, images, videos, voicemails, audio files etc.

4) Veracity
It refers to the assurance of quality/integrity/credibility/accuracy of the data. Since the data is collected from multiple sources, we need to check the data for accuracy before using it for business insights.

5) Value
Just because we collected lots of Data, it's of no value unless we garner some insights out of it. Value refers to how useful the data is in decision making. We need to extract the value of the Big Data using proper analytics.

10. DESCRIBE AMAZON'S RECOMMENDATION SYSTEM (THE 3 STAGES + 3 TYPES OF FILTERING).

Big Data helps Amazon's recommendation system. But how ?

There are 3 stages:
- Events : Amazon tracks and stores data on all customer behavior and activity on the site. Every click of the shopper is stored in the database. Events are captured for all kinds of actions: User liking a product, adding product to cart, and purchasing a product.

- Ratings: Ratings are important because they reveal what a user feels about a product. Indeed, recommendation systems can consider ratings and feedback users provide.

- Filtering: Recommendation systems filter products based on ratings and other user data. They use 3 types of filtering :

1) Collaborative filtering : all the visitor's choices are compared, and they get a recommendation (example: Mr. X likes a,b,c,d and Mr. Y likes a,b,c,d,e -> it's likely for Mr. X liking e)

2) User-base filtering: In user-based filtering, the user's browsing history, likes, purchases and ratings are considered before providing recommendations.

3) Hybrid approach : It consists of both the collaborative and user-base filtering.

11. BRIEFLY EXPLAIN WHAT PREDICTIVE ANALYTICS ARE. DESCRIBE AN INTERESTING APPLICATION FOR PREDICTIVE ANALYTICS.

Predictive analytics refers to using historical data, machine learning, and artificial intelligence to predict what will happen in the future. This historical data is fed into a mathematical model that considers key trends and patterns in the data. The model is then applied to current data to predict what will happen next.
Using the information from predictive analytics can help companies—and business applications—suggest actions that can affect positive operational changes. Analysts can use predictive analytics to foresee if a change will help them reduce risks, improve operations, and/or increase revenue.

UNIT 3: BLOCKCHAIN & CRYPTOCURRENCIES

12. SELECT 1 MAJOR PRO AND 1 MAJOR CON OF CRYPTOCURRENCIES. DESCRIBE THEM IN DETAIL.

Con : Electric consumption caused by mining

Pro : decentralized system

13. BLOCKCHAIN HAS MANY OTHER APPLICATIONS THAN CRYPTOCURRENCIES. SELECT AND DESCRIBE 2 USES/APPLICATIONS.

Shared info into a wide company

Bank

AUTONOMOUS CLASS (17 NOVEMBER): GDPR AND RPA

14. WHAT IS GDPR? WHAT WAS IT DESIGNED FOR? WHAT DOES GDPR COMPLIANCE REQUIRE FROM ORGANISATIONS?

GDPR, or The General Data Protection Regulation, strengthens privacy laws across the European Union to fit the digital age. Implemented in 2018, GDPR is the backbone of the EU's data protection and privacy legislation.

It was designed to protect personal information from unnecessary risks by specifying how businesses store handled and share personal information.

GDPR compliance requires organizations to get organized, to better understand what data the businesses have and how it's stored. This increased understanding, proactively helps streamline detection and response in the event of a costly security incident, like a data breach.

15. WHAT IS RPA? DESCRIBE THE BENEFITS OF RPA FOR COMPANIES. + DESCRIBE 1 USE/APPLICATION.

Robotic Process Automation, also known as RPA, is the use of software with artificial intelligence (AI) and machine learning capabilities to handle high-volume, repeatable tasks that previously required humans to perform. These tasks can include queries, calculations and maintenance of records and transactions.

Benefits:

Robotic process automation technology can help organizations on their digital transformation journeys by doing the following:

- enabling better customer service.
- ensuring business operations and processes comply with regulations and standards.
- allowing processes to be completed much more rapidly.
- providing improved efficiency by digitizing and auditing process data.
- creating cost savings for manual and repetitive tasks; and
- enabling employees to be more productive.