IBE505 Exam

Candidate: 45

1)

A) I propose the implementation of IoT technology to enable monitoring and tracking of packages. It allows us to digitalize the supply chain. Sensors should be installed in the delivery vehicles carrying the packages, sending data about the current location and condition. Edge computing would make it possible real-time tracking because the data can be analyzed close to the sensor. Alternatively, data could be sent to the cloud for computation and storage.
Blockchain technology can be used to store the data in a publicly distributed ledger. Data published in the blockchain cannot be deleted or changed, increasing trust for customers and stakeholders. It would be an accessible way to view the data which have been generated by the sensors.

B)

- IoT: Technology that connects products to the internet. Consists of three components: Connectivity, sensing, and computing.
- Blockchain: A solution that enables actors to publish transactions containing data or currency to a digitally distributed blockchain. Mechanisms in the blockchain ensures that transactions cannot be deleted or altered, and solves the double spending problem

C) My role as a CIO is to deploy and maintain the technology to support different business operations. He is responsible for the overall IT strategy and implementation of and organizations technology infrastructure. In this case, it would be my responsibility to deploy the IoT solution.

D) The digital skill gap can be bridged by providing training and education, crowdsourcing and hackathons. Hackathons enable new ways of involving, grooming, and motivating digital talent within a company or in the ecosystem.

E) Goal 13 – Climate action: My solution will make the delivery more efficient. As a result, there should be less miles driven, reducing green-house gas emissions.

2)

A) I propose implementing Virtual Reality (VR) technology. It would let them simulate the experience of being present at the lab. It makes it possible to generate images, sound, and other sensations, letting them collaborate and experiment from home.

B)

- They can use network monitoring to detect suspicious activities from the student, assuming the student is located inside the school network. Data being transmitted in the network would be monitored and analyzed. A camera can be set up in their room to monitor their computer screen, and make sure the student is working alone.

C)

- Machine Learning: A classical machine learning solution can be used for classification of network activity, given that the transmitted dataset and features are not too complex. A supervised algorithm would require labeled input data for the training process.
  Deep learning is commonly used to process and analyze video and image data, as they can achieve higher accuracy in applications of this area. This can be used with the IoT camera.
- IoT: The camera acts as an IoT sensor, sending data over a network connection. The components of an IoT solution are: Sensing, connectivity, and computing.

D) Online learning has a strong dependance on internet connectivity and capable devises. The digital divide can be a significant challenge, where a portion of students do not have access to necessary technology or network connectivity, or they cannot afford it.
Some students prefer physical attendance, making the switch to digital teaching difficult. They might struggle with motivation or find it difficult to structure the day for when to watch lectures and complete assignments.

E) Goal 4 – Quality education: VR technology would bring inclusivity and quality learning, letting everyone participate and collaborate remotely.

3)

A) I suggest increasing automation in the business process to reduce dependency on medical personnel for less critical tasks. This would mitigate the problem of healthcare personnel shortages. Manual tasks can be automated to increase efficiency.

Providing virtual visits to patients would make it easier to reach rural areas and can be more convenient for the patients. Healthcare personnel would save time by not having to travel to each patient, increasing the efficiency. It would increase the availability of the healthcare personnel.

B)

- Robotics: Medical robots that enable automation for redundant tasks such as distribution of medicines and tools.
- IoT: IoT technology to enhance remote healthcare visits. It would enable remote monitoring, letting them know when a visit is necessary.

C)

- Advantages: A public cloud can be used for data storage and computing. They would not need to design, purchase, install, configure, and manage the infrastructure. There would be a smaller investment cost, and there would be more resources and capabilities available for other tasks. The cloud provides scalability and agility.
- Disadvantages: Personal data about patients are sent to and stored by a 3rd party. This brings privacy concerns. There will be less control of the data, software, and hardware. Additionally, total cost might be higher in the long term.

The four different cloud models are:

- Public cloud: The cloud provider offers access to the cloud hardware and software services though the internet. Rather than being integrated in the business, cloud infrastructure is hosted and managed by the provider. The user is charged based on usage.

- Private cloud: This cloud infrastructure is operated exclusively for one company. It is most often hosted on the company's location and may be managed by themselves or a third party. It therefor gives greater control, security, and compliance to the company.
- Hybrid cloud: Combines Public cloud and Private cloud. Workloads can move seamlessly between the two for optimum performance, security, compliance, and cost-efficiency. For example, sensitive data can be store at their premise, while the public cloud can be used for development resources or storage of other types of data.
- Multicloud: Uses infrastructure and components from different public clouds and services from multiple cloud providers. It is becoming an increasingly popular solution that allows maximum flexibility while fulfilling security requirements.

D) A public-private partnership. They usually involve the private company providing the initial funding for the development of a public infrastructure project and the managing of its development, in exchange for a revenue stream over a period of time. This way, agencies implement technologies sooner than otherwise would be possible.

E) Goal 3: It would promote health and well being for everyone.

4)

A) Defensive strategy: This is a protective strategy against competitors and disruptors. If an organization in your industry is undertaking a industrial digital transformation which would disrupt the industry, you would be forced to transform or fall behind. An example is how Tesla disrupted the car manufactory industry, forcing competitors to increase production of electric cars in order to maintain their share of the marked.

Offensive strategy: When an organization attempts to disrupt the industry. This is an aggressive strategy which is easier to undertake with newer organizations that does not have a legacy culture, but can also come from an older company that wants to gain market share or a competitive advantage. An example is Tesla, who began to future-proof their vehicles by implementing a digital twin making them continuously more autonomous.

B) Crisis, such as COVID-19 bring new and unexpected challenges, often forcing organizations to transform in a very short period of time. They highlight the need to develop a deeper understanding and preparedness for transformation. Progressive companies take the approach that no crisis should go to waste. They find opportunities for industrial digital transformation with these new challenges. Here are some examples:
    - Smartphone location technology used to track location of individuals, to make sure they adhere to social distancing guidelines.
    - 3D printing technology to speed up production of critical materials and equipment for production of masks and ventilators.

C) Technical debt: Caused by not implementing changes at a regular basis, making the technology infrastructure outdated. This commonly occurs in the public sector, by choosing an easy solution in the moment instead of a better solution for the long term. It can accumulate interest, making it harder to implement changes.

D) Failure occurs when individual projects do not achieve expected business value or never reach completion and must be restarted. Indicators of failure include Lack of industrial digital transformation strategy, lack of top-down support, inward focus versus industry trends, a mismatch of planning versus doing, and too much emphasis on technology and not enough on cultural shift.

E) In Lights-out manufacturing, the entire production line is fully automated. The only role of people is for maintenance and repair. This is typically found in semiconductor factories. Lights-out-manufacturing relies on modern technology such as automation, monitoring and control systems, big data, and simulation-based decision making. Standardization is also a necessity.