Just IT

B2W group

Apprenticeships | Training | Recruitment

Data Technician

Name:
Course Date:

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Day 1: Task 1

Please research and complete the below questions relating to key concepts of cloud.

Be prepared to discuss the below in the group following this task.

What can cloud computing do for us in the real-world?	Cloud computing has changed the way businesses and individuals operate in the real world, benefiting everyday activities, business operations, and technological innovation. An example is improved collaboration and productivity, Cloud-based productivity tools like Google Workspace and Microsoft 365 allow teams to collaborate in real-time on documents, spreadsheets, presentations, and more, from different location. Services like Dropbox, Google Drive, and OneDrive allow users to store, sync, and share files across multiple devices, ensuring that everyone has access to the latest version of a document or project. This allows more efficiency and gets the task done quicker, increasing productivity.
How can it benefit a business?	By using cloud services, businesses can reduce costs, increase flexibility and productivity. Cloud services allow businesses to rent computing resources (servers, storage, etc.) instead of investing in expensive physical infrastructure. This removes the high costs of buying, maintaining, and upgrading hardware. Cloud services allow businesses to easily scale their infrastructure based on current demand. For example, during peak seasons like summer holidays, a business can increase its resource such as servers and storage and scale them back once demand decreases.

What's the alternative to cloud computing?	The main alternative to cloud computing is on-premises computing, where businesses or individuals manage and maintain their own hardware, software, and IT infrastructure locally. An example is Edge computing, refers to processing data closer to where it is generated, such as local devices like sensors or local servers. rather than sending the data to a cloud for processing. This can help reduce latency and bandwidth use. It is ideal for autonomous vehicles, remote monitoring, and industrial IoT. However, it is limited in scalability and flexibility compared to cloud computing and requires infrastructure at the edge, which can be expensive and complex to maintain. There is less centralisation and difficulty in managing and updating edge devices.
What cloud providers can we use, what are their features and functions?	Amazon Web Services (AWS) provides a bunch of cloud services, including computing power, storage, networking, machine learning and analytics. It is highly scalable and flexible and offers a broad range of services, covering everything from AI/ML to storage and security. It has a extensive global infrastructure supported with a strong community and documentation. But, it is complex due to the vast number of services so the pricing model can be difficult to navigate. Microsoft Azur is another cloud platform and offers services for computing, networking, databases, analytics, AI, and more. It's popular for organisations and/or individuals already using Microsoft products (e.g., Windows Server, Active Directory). It has seamless integration with Microsoft products and services (e.g., Office 365, Windows Server). It offers strong support and hybrid cloud capabilities. However, it is a complex pricing model that can be challenging for organisations and/or individuals from a non-Microsoft background.

Day 1: Task 2

Please research the below cloud offerings, explain what they are and examples of use cases.

	Explain what it is	When / how might you use this service in the real-world?
IaaS (Infrastructure as a service)	IaaS provides virtualised computing resources over the internet. Instead of purchasing and maintaining physical servers or other hardware, businesses can rent unconfigured networks and computing resources like virtual machines, storage, and firewalls on-demand. IaaS allows businesses to scale up or down easily without worrying about the underlying physical hardware.	E.g. Microsoft Azure provides virtual machines. A large company uses IaaS (such as Microsoft Azure Virtual Desktop) to provide remote workers with virtualised desktops that are hosted on the cloud. This allows employees to access corporate applications securely from home or while traveling.
PaaS (Platform as a service)	PaaS provides a platform allowing customers to develop, run, and manage applications without having to deal with the underlying infrastructure. It removes the difficulties of managing servers, storage, and networking. Therefore, allowing developers to focus solely on coding and application logic. The customer creates and maintains the application.	A e-commerce business uses Google App Engine to manage individual services for product listings, user authentication, and payment processing. Each service runs independently, allowing the platform to scale each service separately as demand changes.

SaaS (Software as a service)	It is a fully configured application that delivers software applications over the internet. So, users do not need to install, manage, or maintain the software on their own devices or servers. With SaaS, the software is hosted and maintained by a third-party provider, who takes care of updates, security, and physical hardware. Users access the software from a web browser or an app, usually through a subscription.	Instead of their own email servers, companies can use SaaS applications Microsoft 365 to handle emails, calendar scheduling, document collaboration, and more. Microsoft 365 is widely used for team communication, file sharing, and real-time collaboration.

Day 1: Task 3

Please research the below terms and explain what they are, when they would be appropriate and a real-world example of where it could be implemented (i.e. what type of organisation).

Public Cloud	Public clouds are cloud environments where services and resources are provided over the internet by third-party providers. These resources, such as servers and storage, are shared among multiple tenants. They would be appropriate for organisations wanting to minimise IT costs (cost effective). It is suitable for businesses with fluctuating workloads requiring flexible resource allocation (scalability). Also, appropriate when handling non sensitive data so no law/regulation breaches. Example is online businesses such as clothing website can use Amazon Web Services (AWS) to host its website, benefiting from scalable computing resources during peak shopping seasons without significant upfront costs in physical servers.
Private Cloud	Private clouds dedicated only to a single organisation. They can be hosted on-premises or by third-party providers, either on-site or off-site. This makes it appropriate for organisations dealing with confidential information as personal data requires network security. Also suitable for organisations required to comply with regulations, such as strict regulatory standards governing data storage and processing. Example is a bank, as they implement a private cloud to manage customer financial data securely, ensuring compliance with financial regulations and maintaining strict control and security over its IT infrastructure.
Hybrid Cloud	Hybrid clouds combine elements of public and private clouds, allowing data and applications to be shared between them. This offers greater flexibility and optimisation of existing infrastructure.It is appropriate when dealing with workloads that fluctuate between peak periods and more stable operations. Also when dealing with data protection, when personal data must remain on-premises, while non-personal data can be processed in the public cloud. Can use the public cloud for backup data if a disaster occurs, ensuring business continuity. An example is a retail company using a private cloud to handle personal customer data and financial transactions, while using a public cloud for hosting its website for customers to access, maintaining security and scalability.

Community Cloud	Community clouds are shared cloud environments where infrastructure is shared among several organisations. It is appropriate when multiple organisations have common goals and need to collaborate. Also to save costs, as organisations can share the costs of cloud infrastructure while addressing mutual needs. It is appropriate when complying with regulations, where organisations must follow compliance standards collectively. An example is research Institutions, multiple universities could collaborate on scientific research for a task. Can use a community cloud to share resources and data securely, maintaining academic research standards and regulations.

Day 2: Task 1

Describe, with examples, the **three** major areas that the Computer Misuse Act deals with.

Area	Description	Example
Unauthorised access to computer material	This first area of the Act focuses on protecting systems from unauthorised access. This means accessing a computer system, program, or data without permission, or using such access for improper purposes.	A hacker accessing someones personal email account to read private messages without the account holder's permission.

Unauthorised access with intent to commit further offences	This deals with situations where unauthorised access to computer systems is used to commit another crime, such as fraud or theft.	A cyber attacker accessing a bank's IT system without authorisation to steal customer account details to commit identity theft or fraud. The initial unauthorised access is the first offence, and the intent to commit further crimes is covered under this section.
Unauthorised modification of computer material	This is the act of changing, deleting, or inserting data on a computer without authorisation. In order to install malware, corrupt files, or deleting critical system data.	A hacker spreading a virus/malware that infects a company's network, resulting in data being corrupted/ stolen. The modification (spreading of the virus) and the unauthorised access to the company's systems would fall under this category.

The computer misuse act 1990 is an act where an individual can be criminalised because of computer related offense. Describe three extra powers that the Police and Justice Act 2006 (Computer Misuse) has added.

Description
Search and Seizure Powers for Computer Material: The Act granted police officers the ability to search premises and seize devices when investigating crimes under the Computer Misuse Act. It allow police to access and confiscate computers, storage devices, and other related digital material that may contain evidence of computer misuse or criminal activity.
Power to Require Assistance in Accessing Data: Police can require individuals to assist in accessing data stored on their computers or devices. This means that individuals in possession of the data may be required to provide passwords or other access to encrypted or locked devices during an investigation. Failure to comply with this can result in a criminal charge.
Offences Involving the Possession of Tools for Hacking: Act created an offence for the possession of tools designed or adapted for committing computer misuse offences. This targets individuals who possess software/hardware that can be used to carry cybercrimes, even if no actual crime has been committed yet. The aim is to deter the preparation or planning of cybercrimes by making the possession of such tools illegal.

Look at the below website to answer the questions:

https://www.gov.uk/personal-data-my-employer-can-keep-about-me

Write down three items of data which a company can store about an employee.
Name
Address
Date of birth

Give three more examples of data that an employer can only store if they first get the employee's permission.
Race and ethnicity
Religion
Political membership or opinions

Conduct further research to answer the below questions.

Provide one example of: Copyright infringement	A person downloads a movie from an illegal site and shares with their friends. The movie is copyrighted, and the creator holds the copyright. Downloading and distributing the movie without permission means the person is infringing on the copyright, as they have not received authorisation to share the film.
Provide one example of: Plagiarism	The website is a fake version of your bank's official website, designed to look legitimate but is controlled by the attacker. This done to get your personal datas to potentially commit other crimes like fraud.
What are two consequences of copyright infringement and software piracy?	A consequence is Legal Penalties, those found guilty can face significant legal penalties, including fines and imprisonment. Another consequence is damage to reputation, loss of business relationships and consumer trust, leading to loss of revenue.

Give three possible consequences for individuals when using pirated software	Legal Consequences: fines, criminal charges, and imprisonment. Security Risks: exposure to malware, viruses, and data theft. Potentially lead to system damage. Lack of Updates/Support: no access to official updates or customer service, leads to potential bugs and performance issues that can then be exploited by cyber attackers.

Listed below are some laws which we have covered today:

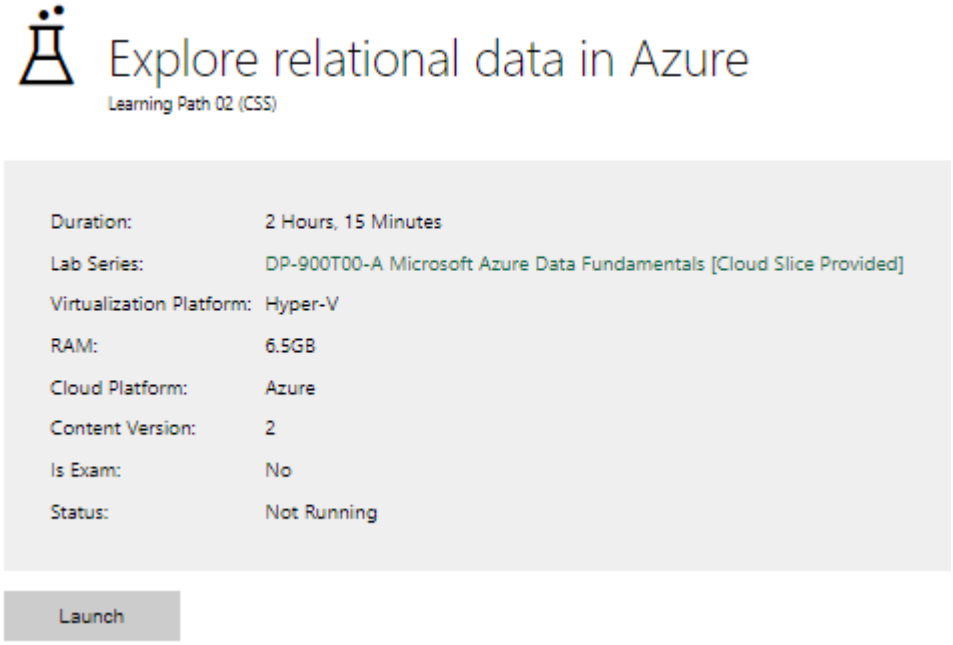
1. Computer Misuse Act 1990
2. Police and Justice Act 2006 (Computer Misuse)
3. Copyright, Designs and Patents Act 1988
4. Copyright (Computer Programs) Regulations 1992
5. The Health and Safety (Display Screen Equipment) Regulations 1992
6. Data Protection Act 2018
7. Consumer Rights Act 2015

- Insert a number in the first column of each row to match each of the statements with one of the above Acts.
- One of statements is incorrect and not illegal. For this statement, write 'Not illegal'.

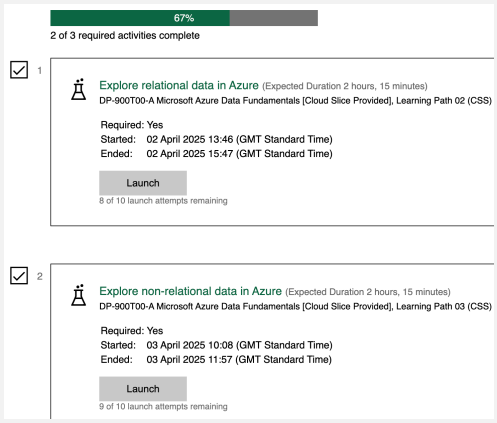
Act number	Clause
3	With some exceptions, it is illegal to use unlicensed software
7	Any product, digital or otherwise, must be fit for the purpose it is supplied for
1	Unauthorised modification of computer material is illegal
Not illegal	It is illegal to create or use a hacking tool for penetration testing
6	Personal data may only be used for specified, explicit purposes
5	Employers must provide their computer users with adequate health and safety training for any workstation they work at
1	It is illegal to distribute hacking tools for criminal purposes
3	It is illegal to distribute an illicit recording
6	Personal data may not be kept longer than necessary
1	Gaining unauthorised access to a computer system is illegal
5	Employers must ensure that employees take regular and adequate breaks from looking at their screens
1	It is illegal to prevent or hinder access (e.g. by a denial-of-service attack) to any program or data held in any computer
6	Personal data must be accurate and where necessary kept up to date

Day 3: Task 1

Please complete the below lab (3) *'Explore relational data in Azure'* and paste evidence of the completed lab in the box provided.

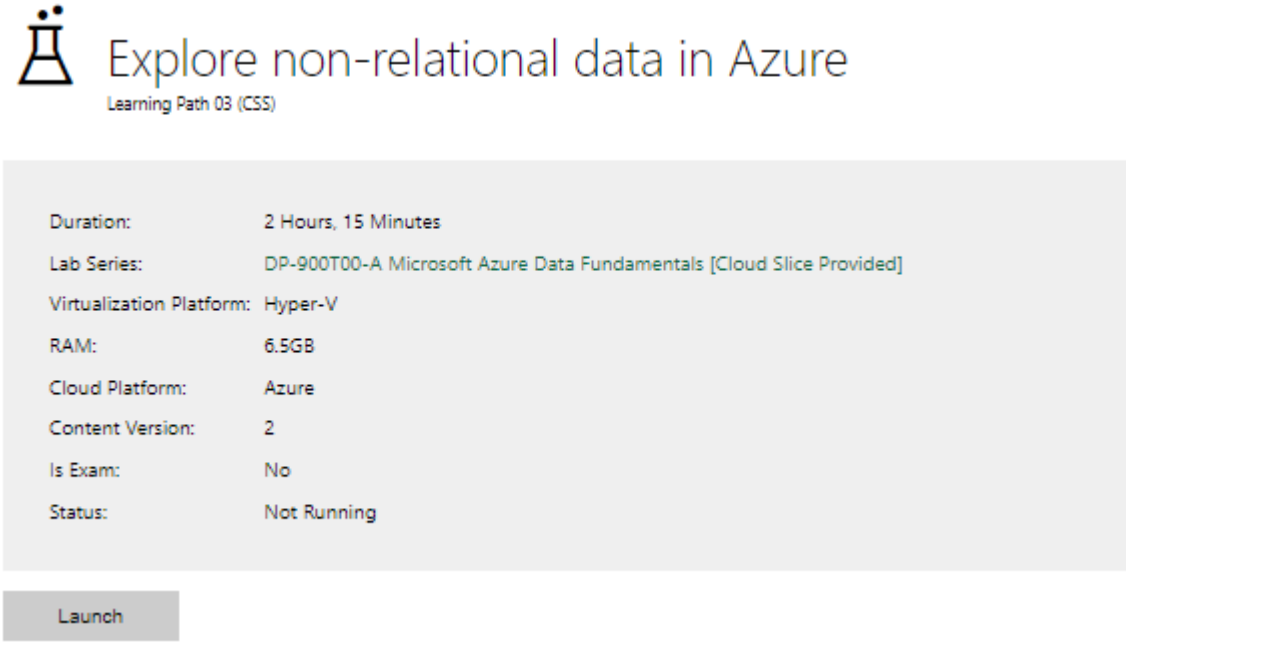


Completed lab

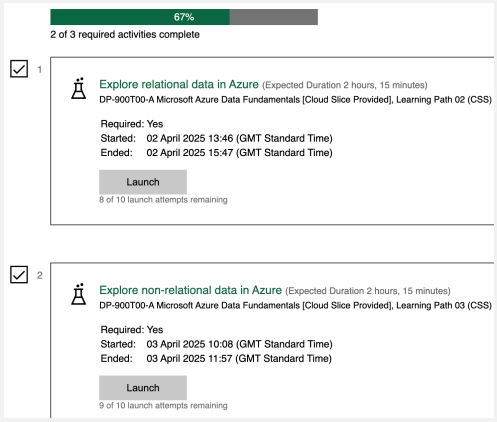


Day 3: Task 2

Please complete the below lab (4) *'Explore non-relational data in Azure'* and paste evidence of the completed lab in the box provided.

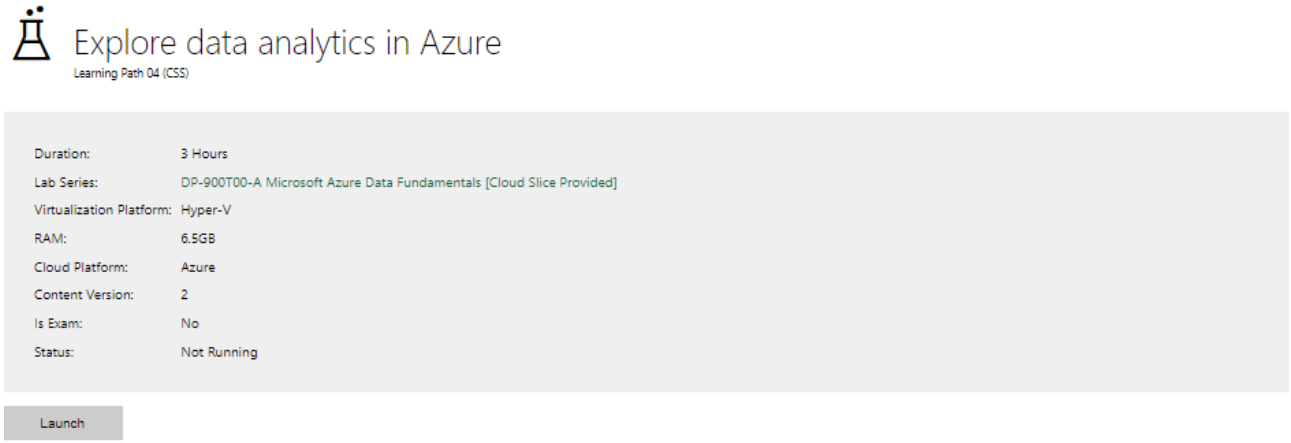


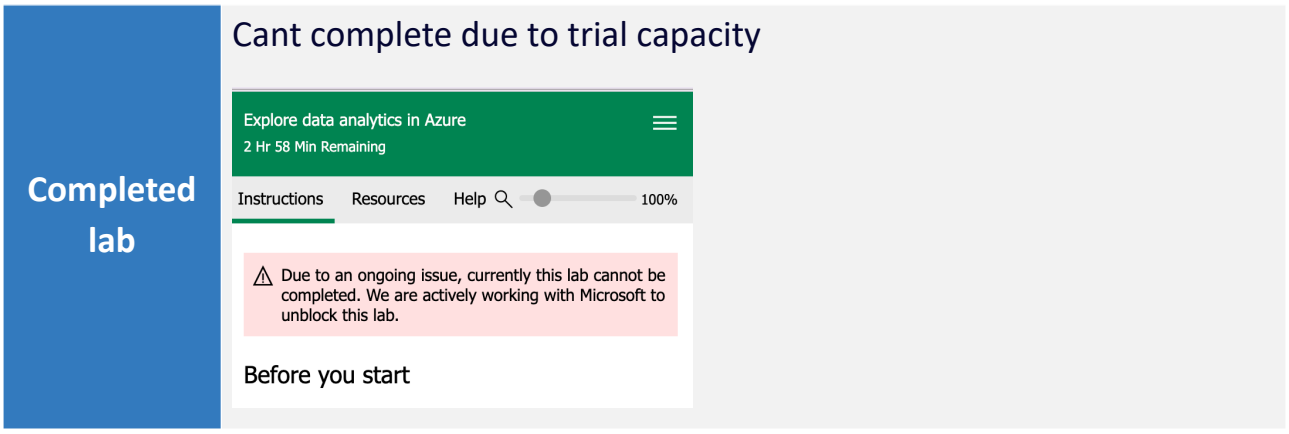
Completed lab



Day 3: Task 3

Please complete the below lab (5) 'Explore data analytics in Azure' and paste evidence of the completed lab in the box provided.

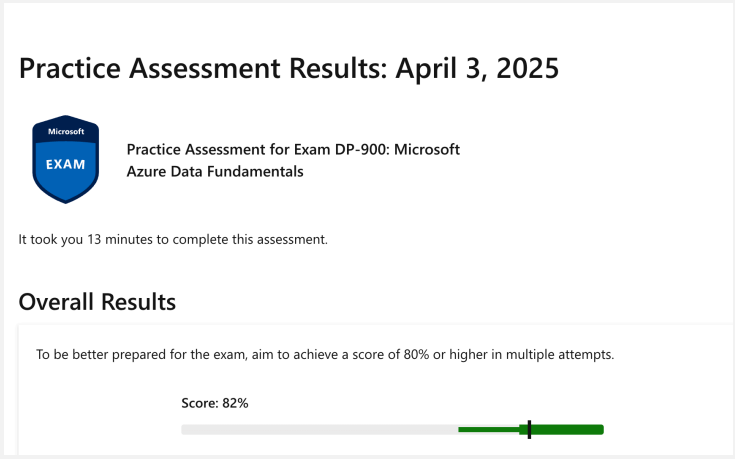




Day 4: Task 1

In your teams, complete the Azure DP-900 practice exam and paste your result below – this is open book and please research and discuss your answers as a team.

Result



This was my second attempt, first attempt after submitting the window froze and had to restart, did not submit.

Day 4: Task 2

1. Scenario Background

"Paws & Whiskers" is a growing pet shop that aims to improve its business by analysing sales, customer information, and inventory data. Currently, the data is collected manually or stored in spreadsheets. Management is interested in transitioning to Microsoft Azure to streamline data storage, analysis, and reporting, enabling them to make data-driven decisions.

2. Data Laws and Regulations

Identify and explain the data laws and regulations relevant to handling customer data within the proposal. Ensure you cover the following points:

- **GDPR Compliance**: Highlight the importance of adhering to the General Data Protection Regulation (GDPR), particularly as it relates to storing and processing customer information.
- **Data Protection Act (DPA) 2018**: Outline how the DPA 2018 may affect the way "Paws & Whiskers" collects and stores data, ensuring compliance with UK laws on data privacy.

- **Other Industry Standards**: Research any additional data protection standards or regulations that may apply to pet shop data, particularly if they involve sensitive or payment information.

3. Azure Service Recommendations

Recommend Microsoft Azure services that would suit the company's data analysis needs and explain why these services are suitable. Your recommendations should include:

- **Data Storage**: Identify suitable storage options, such as **Azure Blob Storage** or **Azure SQL Database**, and discuss the benefits of each for storing large datasets, including inventory, sales transactions, and customer details.
- **Data Analysis Tools**: Recommend tools such as **Azure Machine Learning** for customer behaviour analysis or **Azure Synapse Analytics** for analysing sales trends.
- **Data Integration and Automation**: Explain how services like **Azure Data Factory** could automate data collection and integration processes, improving efficiency.

4. Data Types and Data Modelling

Define the types of data "Paws & Whiskers" will need to work with and describe your approach to data modelling:

- **Data Categories**: Identify key data types, such as customer demographics, transaction history, pet inventory, and product categories.
- **Data Modelling Approach**: Outline how you would structure this data using a relational model or a data warehouse approach, considering factors like tables, entities, relationships, and primary keys.

5. Data Storage Formats and Structures in Azure

Discuss how you would store data within Azure and the formats you would recommend:

- **Data Formats**: Specify recommended formats (e.g., CSV for raw data imports, JSON for structured data, Parquet for analytics) and explain why these formats are suitable for specific data types.
- **Data Security and Encryption**: Include recommendations for securing data using Azure's built-in encryption features and access controls to ensure compliance with data privacy regulations.

6. Additional Considerations

Provide any other considerations that might enhance data handling and efficiency in Azure, such as:

- **Backup and Disaster Recovery**: Outline a backup plan using **Azure Backup** or **Azure Site Recovery** to safeguard against data loss.
- **Data Visualisation**: Discuss potential use of **Power BI** within Azure for creating dashboards that provide management with real-time insights into sales and customer trends.
- **Future Scalability**: Comment on how Azure services can scale as the business grows, accommodating larger datasets and more complex analyses.

Submission Guidelines:

1. **Structure**: Ensure your report is well-organised, with sections for each task (e.g., Data Laws, Azure Services, Data Types, etc.).
2. **Formatting**: Include headings, bullet points where appropriate, and any visuals or diagrams that support your explanations.
3. **References**: Cite any resources or regulations referenced in the report.
4. **Length**: Aim for 1500-2000 words.

Course Notes

It is recommended to take notes from the course, use the space below to do so, or use the revision guide shared with the class:

We have included a range of additional links to further resources and information that you may find useful, these can be found within your revision guide.

END OF WORKBOOK

Please check through your work thoroughly before submitting and update the table of contents if required.

Please send your completed work booklet to your trainer.