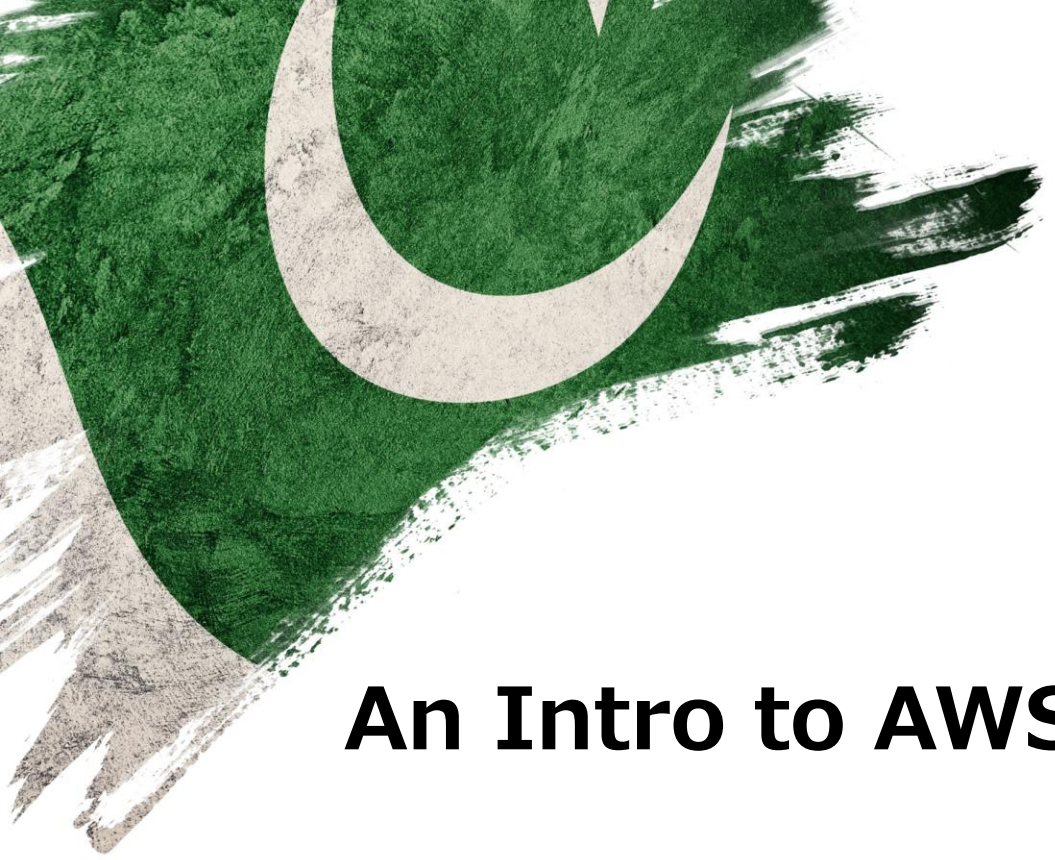


An Intro to AWS, Azure, and Google Cloud

Class 26

30/8/2025

Acknowledgement

The series of the IT & Japanese language course is Supported by AOTS and OEC.

Ministry of Economy, Trade and Industry

Overseas Employment Corporation

What you have Learnt Last Week

We were focused on following points.

- Usage of control and loop flow statement
- Performing Linear Algebra in Numpy
- Software development Life cycle
- Importance of Security compliance
- Introduction of Bash Scripting, Ansible, docker and docker compose
- API testing with Postman and Introduction of Jira
- IAM Permission and S3 bucket

What you will Learn Today

We will focus on following points.

1. A brief introduction to each platform, their origins
2. Look at the foundational services each cloud provider offers, comparing popular options like EC2, Azure VMs, and Google Compute Engine
3. Comparing pricing structures, cost calculators, and management tools
4. Q&A Session

Cloud Platforms Overview

Comparing AWS, Azure, and Google Cloud

- The 3 cloud giants: AWS, Azure, GCP
- Each offers core services (compute, storage, networking, databases, IAM)
- Understanding differences helps in career & project choices

Introduction to Each Platform

Origins and Purpose

- **AWS (2006)** – pioneer in cloud computing
- **Azure (2010)** – enterprise integration focus
- **Google Cloud (2008)** – AI & data-first approach
- All three provide **global-scale cloud infrastructure**

Market Share & Adoption Trends

Who Leads the Cloud Market?

- AWS ~31% → leader & trusted by startups/enterprises
- Azure ~25% → strong in enterprise/government adoption
- GCP ~11% → popular for AI/ML-driven companies
- Different platforms attract different user groups

Core Philosophy

What Makes Each Platform Unique

- **AWS** → *Breadth of Services* (largest catalog)
- **Azure** → *Enterprise Integration* (Microsoft ecosystem)
- **GCP** → *Data & AI Leadership* (BigQuery, TensorFlow)

Compute Services

Powering Applications in the Cloud

- **AWS EC2** → huge variety of instance types
- **Azure VMs** → strong Windows integration, hybrid-ready
- **GCP Compute Engine** → flexible machine types, container-optimized

Used for running apps, websites, backend services

Storage Services

Storing and Protecting Data

- **AWS S3** → industry-leading object storage
- **Azure Blob** → seamless integration with Microsoft tools
- **Google Cloud Storage** → global consistency & speed

Used for media, backups, static website hosting

Networking Services

Connecting Cloud Resources Securely

- **AWS VPC** → highly customizable networking
- **Azure VNets** → integrates with Active Directory
- **GCP VPC** → global VPC, not region-bound

Used for secure communication between services

Database Services

Managing Data Efficiently

- **AWS RDS** → supports MySQL, PostgreSQL, Oracle, Aurora
- **Azure SQL Database** → great for Microsoft SQL workloads
- **Google Cloud SQL** → managed PostgreSQL/MySQL/SQL Server

Used for apps needing structured data storage

Identity & Access Services

Controlling User Access & Security

- **AWS IAM** → fine-grained permissions per user/role
- **Azure AD** → enterprise identity, hybrid integration
- **GCP Cloud IAM** → role-based, resource-level security

Ensures only authorized people access resources

Pricing Models in Cloud

On-Demand, Reserved, and Spot Instances

1. **On-Demand:** Pay-as-you-go, flexible but costly for long term.
2. **Reserved:** Commit 1–3 years, big discounts, stable workloads.
3. **Spot:** Cheapest option, but resources can be reclaimed anytime.
4. ***Example:*** *Use Reserved for production, Spot for testing/training.*

- **Rule of Thumb**

• **Predictable workloads** → Reserved Instances / Savings Plans.
• **Unpredictable workloads** → On-Demand + Spot mix.

Free Tier & Cost Management

Keeping Costs Under Control

Free Tier: Limited hours/storage for learning (AWS 12 months, Azure/GCP similar).

Pricing Calculators: Estimate bills before deploying.

Cost Optimization Tools:
AWS Trusted Advisor
Azure Advisor
GCP Recommender API

Billing Alerts: Set budgets & get email/SMS alerts.

Cloud Management Interfaces

Consoles, CLI & SDKs

- **Consoles:** AWS Console, Azure Portal, GCP Console → Web dashboards.
- **CLI & SDKs:** Automate tasks from terminal or code.
- **Best practice:** Use CLI/IaC for repeatability & team collaboration.

Infrastructure as Code & Monitoring

Automating & Tracking Cloud Resources

IaC Tools: CloudFormation (AWS), ARM Templates (Azure), Deployment Manager (GCP).

Monitoring Tools:

- AWS CloudWatch
- Azure Monitor
- GCP Cloud Logging/Monitoring

Benefits: Detect failures, optimize performance, ensure compliance.

Cloud Security & Compliance Basics

Building Trust in the Cloud

Shared Responsibility Model: Cloud provider secures infrastructure, customer secures apps & data.

Compliance Standards: GDPR, HIPAA, ISO, SOC2.

Features: Identity management, encryption, logging.

Takeaway: Security must be **continuous, not one-time setup**.

Strengths & Weaknesses of Providers

Comparing AWS, Azure & GCP

- **AWS:** Broadest service portfolio, but complex & expensive.
- **Azure:** Strong hybrid integration, weaker UI & learning curve.
- **GCP:** Best in AI/ML, but smaller global presence.

Vendor lock-in: Moving data/services between clouds can be costly.

Case Studies & Real-World Examples

Who Uses What?

- **AWS:** Startups, SaaS apps (e.g., Netflix, Airbnb).
- **Azure:** Enterprises, governments (e.g., BMW, Office 365 users).
- **GCP:** Data-heavy & AI companies (e.g., Spotify, PayPal, YouTube).

Industry adoption:

- Finance → Azure
- Media/Streaming → AWS
- AI/Analytics → GCP

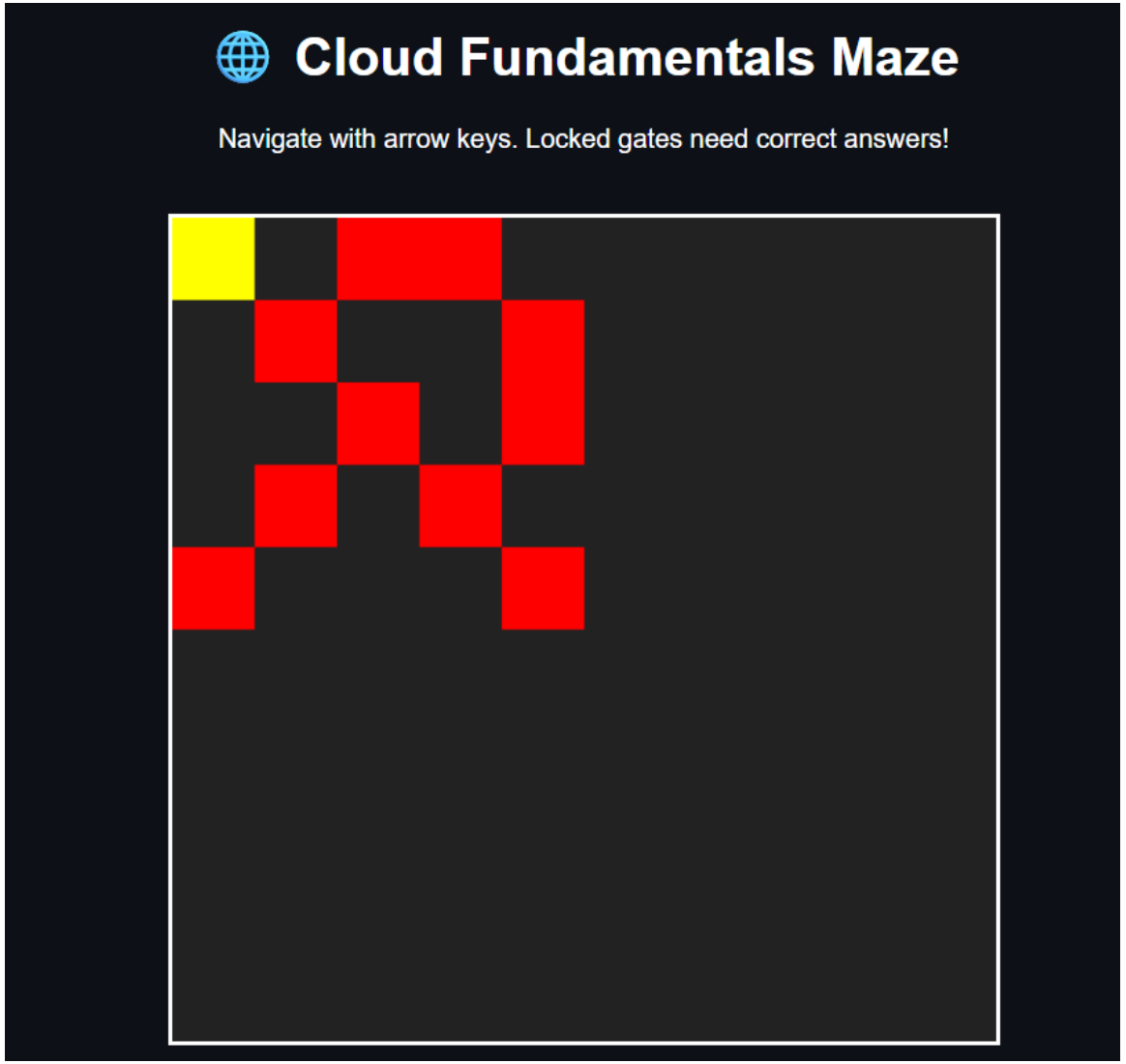
Game 1

Cloud Fundamentals Maze

Step1: Start the Game by Clicking the Link

Step2: Click on the Game It will Start

https://codepen.io/HT-Design/full/RNWYpdE



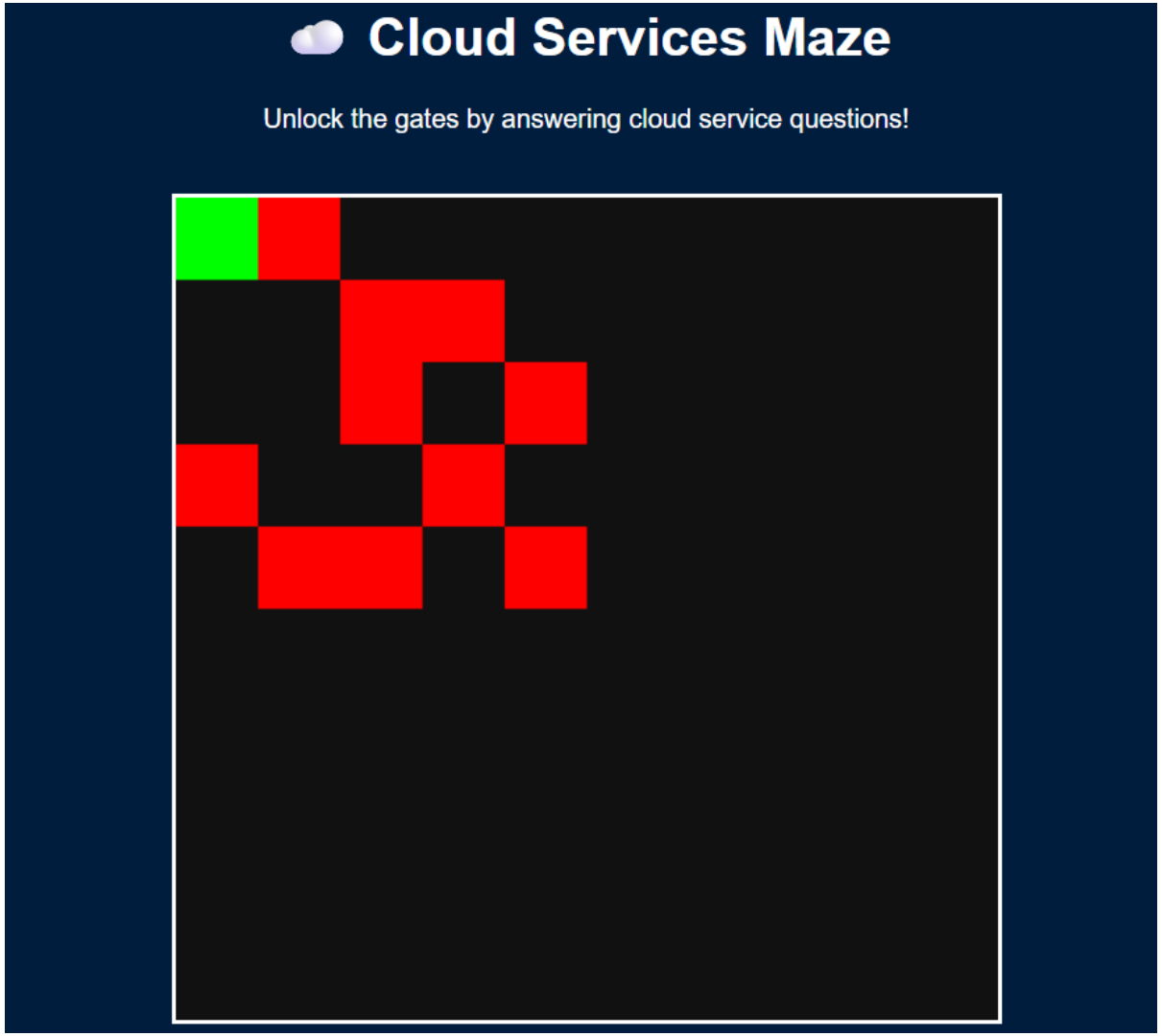
Game 2

Cloud Services Maze

Step1: Start the Game by Clicking the Link

Step2: Click on the Game It will Start

https://codepen.io/HT-Design/full/NPGLpwZ



Assignment

Quiz Section

Quiz

Everyone student should click on submit button before time ends otherwise MCQs will not be submitted

[Guidelines of MCQs]

1. There are 20 MCQs
2. Time duration will be 10 minutes
3. This link will be share on 12:25pm (Pakistan time)
4. MCQs will start from 12:30pm (Pakistan time)
5. This is exact time and this will not change
6. Everyone student should click on submit button otherwise MCQs will not be submitted after time will finish
7. Every student should submit Github profile and LinkedIn post link for every class. It include in your performance

Assignment

Assignment should be submit before the next class

[Assignments Requirements]

1. Create a post of today's lecture and post on LinkedIn.
2. Make sure to tag @Plus W @Pak-Japan Centre and instructors LinkedIn profile
3. Upload your code of assignment and lecture on GitHub and share your GitHub profile in respective your region group WhatsApp group
4. If you have any query regarding assignment, please share on your region WhatsApp group.
5. Students who already done assignment, please support other students

Q&A Session

ありがとうございます。
Thank you.
شکریا

For the World with Diverse Individualities