POWERING POTENTIAL

Welcome Pack

Lloyds Banking Group
Software Engineering Reskill
Cohort 2

April 2024

Welcome

We are excited to welcome you on cohort 2 of the Lloyds banking group Software Engineering Reskill Programme with QA.

Please see your full schedule and overview for your upcoming learning.

If you have any questions, reach out to us at lbgprogrammes@qa.com

1. Schedule

Week	Monday	Tuesday	Wednesday	Thursday	Friday
	22/04	23/04	24/04	25/04	26/04
0					**SupportNets Induction** 15:00 – 16:30
	29/04	30/04	01/05	02/05	03/05
1	**Introducing GIT** 09:30 – 16:30	**Introduction to DevOps** 09:30 – 16:30	**Understanding Agile & Scrum** 09:30 – 17:00	**Project 0** 09:30 – 16:30	**Teach the Nation to Code** 09:30 – 15:30 **SupportNet Retro:** 15:30 – 17:00
	06/05	07/05	08/05	09/05	10/05
2	**Bank Holiday**	**Web Development Fundamentals: HTML & CSS** 09:30 – 16:30			**SupportNet Retro:** 15:30 – 17:00
	13/05	14/05	15/05	16/05	17/05
3	**Web Development Fundamentals: JavaScript** 09:30 – 16:30				**SupportNet Retro:** 15:30 – 17:00
	20/05	21/05	22/05	23/05	24/05
4	**NodeJS & ExpressJS Awareness – Cloud Academy** 09:30 – 16:30		**Web Dev Fundamentals: React** 09:30 – 16:30		**SupportNet Retro:** 15:30 – 17:00
	27/05	28/05	29/05	30/05	31/05
5	**Bank Holiday**	**Web Dev Fundamentals: Recap Day** 09:30 – 16:30	**Project 1 – Create Front-end Application** 09:30 – 16:30		**SupportNet Retro:** 15:30 – 17:00
	03/06	04/06	05/06	06/06	07/06
6	**Project 1 – Create Front-end Application** 09:30 – 16:30				**SupportNet Retro:** 15:30 – 17:00

7	10/06	11/06	12/06	13/06	14/06
	CI/CD Jenkins 09:30 – 16:30	**Project 2 - Pipeline Automation** 09:30 – 16:30	**Querying SQL Databases using T-SQL** 09:30 – 16:30		**Mid point assessment** 09:30 – 16:30 **SupportNet Retro:** 09:30 – 11:00
8	17/06	18/06	19/06	20/06	21/06
	Java with Maven 09:30 – 16:30				**SupportNet Retro:** 09:30 – 11:00
9	24/06	25/06	26/06	27/06	28/06
	SpringBoot & Microservices 09:30 – 16:30				**Back-end Recap day** 11:00 – 16:30 **SupportNet Retro:** 09:30 – 11:00
10	01/07	02/07	03/07	04/07	05/07
	Project 3 - Create Java services & integrate with CI/CD 09:30 – 16:30				**SupportNet Retro:** 09:30 – 11:00
11	08/07	09/07	10/07	11/07	12/07
	Project 3 - Create Java services & integrate with CI/CD 09:30 – 16:30				**Project Recap day** 11:00 – 16:30 **SupportNet Retro:** 09:30 – 11:00
12	15/07	16/07	17/07	18/07	19/07
	Google Cloud Fundamentals 09:00 – 17:00	**Docker** 09:30 – 16:30	**Architecting with Google Kubernetes Engine** 09:30 – 16:30		**SupportNet Retro:** 09:30 – 11:00
13	22/07	23/07	24/07	25/07	26/07
	Project 4 - Create GCP Infrastructure and Deploy to GKE 09:30 – 16:30				**SupportNet Retro:** 09:30 – 11:00

	29/07	30/07	31/07	01/08	02/08
14	**Software Development Lifecycle - Recap day** 09:30 – 16:30		**Final week with Presentation** 09:30 – 16:30		**SupportNet Retro:** 09:30 – 11:00

2. Programme Overview

Introducing GIT

GIT is a DevOps tool used for source code management. It is a free and open-source version control system used to handle small to very large projects efficiently. GIT is used to tracking changes in the source code, enabling multiple developers to work together on non-linear development.

Learning Outcomes:

- Understanding GIT basics
- Ability to work with GIT repositories
- Understanding how GIT updates and tracking works
- Understand how branching works
- Ability to use Remotes & Cloning

Introduction to DevOps

The DevOps movement is bold enough to believe there is a better way of building teams and software that has rapidly spread across the development and operations community. This one-day overview helps those beginning their DevOps journey to understand it origins, purpose, and central pillars of the movement.

Learning Outcomes:

- What the DevOps movement is.
- Cultural and openness at the heart of DevOps thinking.
- How working in Agile and Lean help build solutions.
- Automation, orchestration and why they get you to market faster.
- Measurement, logging, and monitoring to understand how you improve.
- Sharing - closing the loop and building from shared success.

Understanding Agile & Scrum

The purpose of the one-day course is to enable staff to identify improvement opportunities in service delivery, based on Agile principles, practices, and techniques. It also prepares them to work in a Scrum team.

Learning Outcomes:

- What is Agile?
- What are the benefits of using Agile?
- What are the values and principals of Agile?
- What is the Scrum framework?
- What are the different Scrum roles and their responsibilities?
- What are the different Scrum events, their purpose, and their value?
- What are the Scrum artefacts?
- How do I manage and refine a product backlog?
- How can I estimate Product Backlog Items?

Web Development Fundamentals – HTML & CSS

You will begin at square one, learning how the Web and web pages work, and then steadily build from there. By the end of the course, you will have the skills to create a website that is responsive to the device that it is being viewed on and contains features needed for reliable website development. Learn how to use the latest techniques, best practices, and current web standards - including HTML5 and CSS3.

Learning Outcomes:

- Describe how web pages are delivered over the Internet.
- Build structured HTML pages with text, links, images, tables, and forms.

- Use style sheets (CSS) for colours, background, formatting text, page layout and simple transition, transformation, and animation effects.
- Use Responsive Web Design techniques to make pages display well on all devices they may be viewed on.

Web Development Fundamentals – JavaScript

This course follows on from Web Development Fundamentals – HTML and CSS (QAHTMLCSS) to add the basics for the third skill needed for web development, JavaScript. This course, using the latest revision of JavaScript and developer tools to allow this, starts with the basics needed to write simple scripts and builds on this to prepare you for using modern JavaScript frameworks and libraries such as React and Angular.

Learning Outcomes:

- Set up a development environment for programming in modern JavaScript.
- Manage and use JavaScript types and data structures effectively.
- Control the flow of programs using loops and conditional code.
- Use JavaScript alongside HTML, manipulating and changing the DOM.
- React to events to make web pages respond to user interaction, including form handling.
- Produce and use basic Object-Oriented JavaScript Web Development Fundamentals – React.
- Learners will further enhance their knowledge of JavaScript and to work with 3rd party libraries and frameworks and use NPM for installation.
- The curriculum will encompass React topics, including client-side routing, state management, and the creation of functional components.
- Learners will harness the power of the React JS framework to develop fully functional Single Page Applications that seamlessly interact with backend systems through REST APIs.

NodeJS & ExpressJS Awareness - Cloud Academy Pathway

Learning Outcomes:

1. Fundamental understanding of NodeJS
2. Fundamental understanding NPM
3. To be able to build a Back-end application using ExpressJS

Web Development Recap Day

A learner checkpoint focusing on recapping front-end learnings to date with the trainer. In addition, a Cloud Academy pathway that covers front-end technologies will be provided as an option for learners who want to take their learning to the next level.

CI/CD with Jenkins

This course looks at how to install and manage a Jenkins server. We have a project to build and deploy and over the course we will look at how to connect Jenkins to git and pick up notifications, how to define when and how to build the software and how to deploy it to a Tomcat webserver. We also look at the administration side including how to define projects, how to setup Jenkins slave machines and how to define where a project should be built.

Learning Outcomes:

- What is CI/CD?
- What are source control principles?
- Installing Jenkins
- Manual builds
- Connecting and reacting to source control
- Securing Jenkins
- Types of Slaves
- Jenkins best practices

Querying SQL Databases using T-SQL

This course will provide you with the basic knowledge and skills to create queries using Transact-SQL. It will teach you how to select, filter and sort data from multiple tables and how to use views and stored procedures.

Learning Outcomes:

- Applying filters to the output to reduce the number of rows returned.
- Analysing data to return aggregated results using group by and a few functions.
- Using functions to convert and cast the data between data types.
- Learners will be exposed to Programming with T-SQL.
- Learners will have a good awareness of Pivoting & Grouping Sets.
- Learners will be able to use Table Expressions.

Mid-Point Programme Assessment

The mid-point assessment will be conducted via Cloud Academy and will be used to assess the learners on the content they have covered in the first part of the programme (GIT, Web Development, Agile, SQL & Databases).

Developing Applications with Java and Maven

This course is aimed at programmers who are new to the Java programming language and want to develop applications using programming concepts key to every language. Those who take the course will gain a thorough understanding of the core concepts involved with Java programming and put these theoretical concepts into action via practical tutorials and problem solving-based exercises.

Learning Outcomes:

- Program and develop Java applications with the use of data types, conditionals, and iteration.
- Understand the importance of flow control within programming.
- Define and discuss the syntax required in the Java programming language.
- Implement object-oriented principles within an application.
- Create Java classes and objects with their own methods and properties.
- Manage errors via exception handling within a program.
- Gain an appreciation for functional programming and test-driven development.
- Work with packages and dependencies via Maven.

Developing Microservice Applications with Springboot

This course is aimed at programmers who have a strong understanding of the Java programming language and want to take the next step by developing API-focused applications with Spring and Spring Boot. Those who take the course will gain a thorough understanding of the core concepts involved with REST and Spring Boot application development and put these theoretical concepts into action via practical tutorials and problem solving-based exercises.

Learning Outcomes:

- Program and develop Spring Boot applications.
- Understand the usage and variations within Dependency Injection.
- Define the implementation of a multi-tier and microservice architecture.
- Create applications that use controllers and services.
- Gain an appreciation for the persistence layer within Spring Boot applications.
- Test Spring Boot applications.

Back-End Recap Day

A learner checkpoint focusing on recapping back-end learnings to date with the trainer. In addition, a Cloud Academy pathway that covers front-end technologies will be provided as an option for learners who want to take their learning to the next level.

Google Cloud Fundamentals: Core Infrastructure

This one-day instructor-led class provides an overview of Google Cloud Platform products and services. Through a combination of presentations, demos, and hands-on labs, participants learn the value of Google Cloud Platform and how to incorporate cloud-based solutions into business strategies.

Learning Outcomes:

- Identify the purpose and value of Google Cloud Platform products and services.
- Interact with Google Cloud Platform services.
- Describe ways in which customers have used Google Cloud Platform.
- Choose among and use application deployment environments on Google Cloud Platform: Google App Engine, Google Container Engine, and Google Compute Engine.
- Choose among and use Google Cloud Platform storage options: Google Cloud Storage, Google Cloud SQL, Google Cloud Bigtable, and Google Cloud Datastore.
- Make basic use of BigQuery, Google's managed data warehouse for analytics.

Introducing Docker

This course covers the basics of Docker, starting with an introduction to containers and the idea behind the software. Then we look at installing Docker and creating our first 'Hello world' style containers. We then move onto automating this process with Dockerfiles and pushing our containers to the main Docker repository. We then look in more details at how to manage persistent data with containers and how to link containers together. After this we have a look at creating and managing our own Docker registry, rather than using the main Docker hub. This will allow companies to store their images and containers internally. Finally, we have a look at three tools that Docker are currently working on to help manage containers. Compose allows us to define one or more containers to be setup in a single file. Machine allows us to set up new virtual or cloud-based machines which we can then deploy our containers to. Finally, swarm allows for high replication services and managing clusters of machines from within Docker.
The course will be taught in a hands-on fashion. There will be some presentation and examples shown, but the majority of the time will be spent with 'hands on keyboards' having a look at what Docker is capable for yourselves.

Learning Outcomes:

- Introduction to Containerisation
- Dockerfiles
- Volumes and Linking Containers
- The Docker Registry
- Other Docker Tools

Architecting with Google Kubernetes Engine

Learn how to deploy and manage containerized applications on Google Kubernetes Engine (GKE). Learn how to use other tools on Google Cloud that interact with GKE deployments. This course features a combination of lectures, demos, and hands-on labs to help you explore and deploy solution elements—including infrastructure components like pods, containers, deployments, and services—along with networks and application services. You will also learn how to deploy practical solutions, including security and access management, resource management, and resource monitoring.

Learning Outcomes:

- Understand how software containers work.
- Understand the architecture of Kubernetes.
- Understand the architecture of Google Cloud.
- Understand how pod networking works in Google Kubernetes Engine.
- Create and manage Kubernetes Engine clusters using the Google Cloud Console and gcloud/kubectl commands.
- Launch, roll back, and expose jobs in Kubernetes.
- Manage access control using Kubernetes RBAC and IAM.
- Manage pod security policies and network policies.
- Use Secrets and ConfigMaps to isolate security credentials and configuration artifacts.
- Understand Google Cloud choices for managed storage services.
- Monitor applications running in Google Kubernetes Engine.

Software Development Lifecycle Recap Day

High-level overview of what technologies have been covered so far and how they have been utilized.

Projects

Hands-on projects are incorporated into the programme which are positioned after each learning block. The objective is to put theory covered in previous weeks into practice. The below details the focus of each project.

Project 0 – Setup

This is equivalent of the set-up sprint and will be part of the GIT exercises by setting up a GIT repository that will be used by rest of the projects for source and version management.

Project 1 – Create Front-end Application

Project 1 and 3 forms the application part of the Estate Agent Management case study. Project 1 consist of the user interface made up of HTML, CSS, JavaScript and React.

Project 2 – Pipeline Automation

Project 2 serves as a foundational step towards creating an automated workflow that subsequent projects can leverage. Normally, the CI/CD pipeline is created at the beginning of a development project, but this is pushed back to after WEB development modules to allow learners to have a better understanding what they are automating.

Project 3 – Create Java Services & Integrate with CI/CD

Project 3 is concerned with Java microservice in which you will need implement the REST API as defined for Project 1. This project will also use the pipeline to automate the build.

Project 4 – Create GCP Infrastructure and Deploy to GKE

Project 4 is focused on building the infrastructure on which the full stack application will deploy and run GCP and GKE that can be accessed from the internet.


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