Generative AI - Prompt Engineering Course for "QA community"

I. Course Overview

This course provides comprehensive training on prompt engineering for generative AI models for QA community. Participants will gain in-depth knowledge and practical skills to create effective prompts, optimize model outputs, and apply generative AI techniques in various stages of software testing process.

II. Course Objectives

- Understand the fundamentals of generative AI and prompt engineering.
- Develop skills to create, test, and refine prompts for various AI models.
- Learn best practices for optimizing prompt performance.
- Explore real-world applications of generative AI in QA and Testing.
- Gain hands-on experience with leading AI tools and platforms.

III. Course Time Sheet

Certainly! Below is a detailed time sheet in hours for each topic within the Generative AI - Prompt Engineering Course for QA and Automation testers. This breakdown assumes a total of 40 hours for the course, which is typically spread over 5 week-end (Sat-Sun) days intensive program or over several weeks in a part-time course format.

Total Duration: 40 Hours for 5 intensive weekend days (SAT-8AM to 12PM, SUN-8AM to 12 PM)

Chapter 1: Introduction to Generative AI in QA

1.1 What is Generative AI? - 1 Hour
- Definition and Overview (20 minutes)
- Historical Context and Evolution (20 minutes)
- Key Concepts and Terminology for QA Testers (20 minutes)

1.2 Types of Generative AI Models - 2 Hours
- Language Models for Test Case Generation (40 minutes)
- Image Generation Models for UI Testing (40 minutes)

- Multi-modal Models in Automation Testing (40 minutes)

1.3 Applications of Generative AI in QA - 1 Hour
- Test Case Generation and Coverage (10 minutes)
- Code Generation and Completion (e.g., Copilot, Codeium, …etc.) (20 minutes)
- Bug Detection and Fixing (20 minutes)
- Continuous Integration and Deployment (CI/CD) Optimization (10 minutes)

Chapter 2: Fundamentals of Prompt Engineering for QA

2.1 Understanding Prompts - 1.5 Hours
- Definition and Importance in QA (30 minutes)
- Structure of a Prompt for Automation Testing (30 minutes)
- Role of Prompts in AI Model Performance for Test Automation (30 minutes)

2.2 Crafting Effective Prompts for Testing Automation - 2 Hours
- Clarity and Specificity in Testing Scenarios (40 minutes)
- Contextual Relevance for Automated Test Case Generation (40 minutes)
- Techniques for Refining Prompts (40 minutes)

2.3 Common Challenges and Solutions in Prompt Engineering for QA - 1.5 Hours
- Ambiguity and Vagueness in Testing Prompts (30 minutes)
- Bias and Ethical Considerations in QA AI Models (30 minutes)
- Strategies for Troubleshooting Prompts in Automation (30 minutes)

Chapter 3: Techniques for Optimizing Prompts in QA

3.1 Iterative Prompt Design for Test Automation - 1.5 Hours
- Testing and Evaluation of Prompts (30 minutes)
- Feedback Loops for Continuous Test Improvements (30 minutes)
- Continuous Improvement in Test Case Generation (30 minutes)

3.2 Advanced Prompting Techniques for QA - 2 Hours
- Prompt Chaining for Complex Test Scenarios (40 minutes)
- Zero-shot, One-shot, and Few-shot Learning in Test Case Design (40 minutes)
- Using Auxiliary Prompts for Comprehensive Test Coverage (40 minutes)

3.3 Tools and Platforms for Prompt Engineering in QA - 2.5 Hours
- Overview of Tools (OpenAI Playground, Codeium, etc.) (1 hour)

- Integrating Prompts with Different AI Models for Test Automation (1.5 hours)

Chapter 4: Hands-On Practice with Generative AI Tools in QA

4.1 Setting Up the Test Automation Environment - 1 Hour
- Installing Necessary Software for Test Automation (30 minutes)
- Accessing Cloud-Based AI Services for Test Generation (30 minutes)

4.2 Practical Exercises in Test Automation - 3 Hours
- Creating Basic Prompts for Test Case Generation (1 hour)
- Experimenting with Different AI Models for Test Automation (1 hour)
- Analyzing and Refining Outputs in Testing (1 hour)

4.3 Case Studies in Test Automation - 2 Hours
- Real-World Examples of Successful Prompt Engineering in QA (1 hour)
- Lessons Learned and Best Practices in Test Automation (1 hour)

Chapter 5: Advanced Topics in Prompt Engineering for QA

5.1 Prompt Engineering for Specialized Domains in QA - 1.5 Hours
- Healthcare Test Automation (30 minutes)
- Finance Domain Test Cases (30 minutes)
- Education Sector Automation (30 minutes)

5.2 Ethical and Responsible AI in QA Testing - 2 Hours
- Addressing Biases in AI for Test Automation (40 minutes)
- Ensuring Fairness and Transparency in QA (40 minutes)
- Regulatory and Compliance Considerations for AI in Testing (40 minutes)

5.3 Future Trends and Developments in Generative AI for QA - 1.5 Hours
- Emerging Technologies in AI for Test Automation (30 minutes)
- Innovations in Prompt Engineering for Testing (30 minutes)
- Predictions for the Future of AI in QA (30 minutes)

Chapter 6-7: Project Work

6.1 Project Guidelines for QA and Automation Testers - 2 Hours
- Project Objectives and Requirements for QA Professionals (1 hour)
- Selection of a Domain or Application in Test Automation (1 hour)

6.2 Project Development for Test Automation - 6 Hours
- Designing and Testing Prompts for Automation (2 hours)
- Implementing and Documenting the Project (2 hours)
- Final Evaluation and Feedback (2 hours)

Course Wrap-Up

- Summary of Key Learnings in QA Automation (1 hour)
- Additional Resources and Next Steps in AI for Testing (1 hour)
- Q&A Session and Course Feedback (1 hour)

IV. Target audience for this Generative AI - Prompt Engineering Course:

The common designations for QA professionals can vary depending on the organization and their specific roles. Here are some typical designations for both manual testers and automation engineers:

QA Manual Testers:

1. QA Tester / QA Manual Tester: This is a straightforward title that reflects the tester's focus on manual testing.
2. QA Analyst: This designation often implies a broader role that includes test planning, design, and execution, with a focus on manual testing.
3. Manual Test Engineer: This title highlights the engineering aspect of the role, emphasizing the technical skills required.
4. Software Tester: A general term that can apply to anyone involved in testing, though often implies a focus on manual testing.
5. Test Analyst: Similar to QA Analyst, with an emphasis on analyzing requirements and designing test cases.
6. Quality Assurance Specialist: A role that typically involves ensuring product quality through manual testing and other QA activities.

Automation Engineers:

1. QA Automation Engineer: This title highlights the focus on automating tests.
2. Test Automation Engineer: Similar to QA Automation Engineer, emphasizing the engineering and development of automated tests.
3. Automation Test Engineer: This designation is similar but can sometimes imply a more hands-on role in executing automated tests.

4. Software Development Engineer in Test (SDET): This title implies a dual role of developing software and writing automated tests, often requiring strong programming skills.
5. QA Engineer: A broad title that can encompass both manual and automated testing, but in some organizations, it specifically refers to those who automate tests.
6. Quality Engineer (QE): This role focuses on ensuring product quality, often through automated testing and continuous integration practices.
7. Test Engineer: A general term that can apply to both manual and automation testing roles, but in the context of automation, it emphasizes the technical skills required to develop and maintain automated tests.

These designations reflect the varying levels of responsibility, technical skill, and focus areas within QA and testing roles.