# **DevOps Engineering**

* Engineering DevOps: From Chaos to Continuous Improvement and Beyond, Marc Hornbeek
* Learning DevOps: The Complete Guide to Accelerate Collaboration with Jenkins, Kubernetes, Terraform and Azure DevOps, Mikael Krief
* DevOps for Developers: Integrate Development and Operations, The Agile Way, Michael Huttermann

|  |  |
| --- | --- |
|  | **Engineering DevOps** |
|  | **Part-01: What is Engineering DevOps, and Why is It Important?** |
|  | **What is Engineering DevOps?** |
| 01 | Introduction |
|  | DevOps Engineering Blueprint |
|  | DevOps Engineering Tenets and CALMS |
|  | Origins of DevOps form an Engineering Point of View |
|  | The Dilemma of Defining Engineering DevOps |
|  | DevOps Engineering Terms |
|  | **Nine Pillars of Engineering DevOps** |
|  | Introduction |
|  | Leadership Pillar |
|  | Collaborative Culture Pillar |
|  | Design for DevOps Pillar |
|  | Continuous Integration (CI) Pillar |
|  | Continuous Testing (CT) Pillar |
|  | Elastic Infrastructure (EI) Pillar |
|  | Continuous Monitoring (CM) Pillar |
|  | Continuous Security Pillar |
|  | Continuous Delivery (CD) Pillar |
|  | **Why is Engineering DevOps Important?>** |
|  | Introduction |
|  | Engineering DevOps Myths and Realities |
|  | How Will I Know When I Have Engineered DevOps? |
|  | Benefits of Well-Engineered DevOps – ½ |
|  | Benefits of Well-Engineered DevOps – ½ |
|  | Cost of Not Engineering DevOps Properly |
|  | **Part-02: Engineering People, Process, and Technology for DevOps** |
|  | **How Should People, Process, and Technology be Engineered for DevOps?** |
|  | Does DevOps Engineering Require People to be Engineers? |
|  | DevOps People, Process, and Technology Engineering Maturity Levels |
|  | Three Dimensions of Engineering DevOps – People, Process, and Technology – People |
|  | Three Dimensions of Engineering DevOps – People, Process, and Technology – Process |
|  | Three Dimensions of Engineering DevOps – People, Process, and Technology – Technology |
|  | Twenty-Seven DevOps Engineering Critical Success Factors |
|  | Learn DevOps Value-Stream Pipeline Engineering – 1/3 |
|  | Learn DevOps Value-Stream Pipeline Engineering – 1/ 3 |
|  | Learn DevOps Value-Stream Pipeline Engineering – 1/3 |
|  | **Value-Stream Management (VSM)** |
|  | Why Is Value-Stream Management Important to DevOps? |
|  | How Does Value-Stream Management Work with DevOps? – ½ |
|  | How Does Value-Stream Management Work with DevOps? – ½ |
|  | What is Needed to Engineer a Value-Stream Management Solution for DevOps? |
|  | **Application Release Automation (ARA)** |
|  | Why is Application Release Automation Important? |
|  | How Does Application Release Automation Work? |
|  | What is Needed to Implement Well-Engineered ARA? |
|  | **Version Management – 1/3** |
|  | **Version Management – 1/3** |
|  | **Version Management – 1/3** |
|  | **Continuous Decurity (a.k.a. DevSecOps)** |
|  | Why Is Continuou8s Security Important to Engineering DevOps? |
|  | How Does Continuous Security Work with DevOps Engineering? – 1/3 |
|  | How Does Continuous Security Work with DevOps Engineering? – 1/3 |
|  | How Does Continuous Security Work with DevOps Engineering? – 1/3 |
|  | Implementing Continuous Security |
|  | **Service Catalogs Facilitate DevOps Engineering** |
|  | Why Is the Service Catalog Important to DevOps Engineering? |
|  | How are DevOps Service Catalogs Engineered for DevOps? |
|  | What is Needed to Engineer a DevOps Service Catalog? |
|  | **DevOps Governance Engineering** |
|  | Why Is Governance Engineering Important for DevOps Engineering? |
|  | How Is Governance Engineered for DevOps? |
|  | What is Needed to Engineer Governance for DevOps? |
|  | **Site Reliability Engineering (SRE)** |
|  | Why is SRE Important to DevOps Engineering? |
|  | How Does SRE Work with DevOps? |
|  | What is Needed to Engineer SRE with DevOps? |
|  | **DevOps Disaster Mitigation and Recovery** |
|  | **Part-03: Engineering Applications, Pipelines, and Infrastructures for DevOps** |
|  | **DevOps Application Engineering** |
|  | Application Design for DevOps |
|  | Applications for Which DevOps Does Not Apply |
|  | DevOps Applied to Enterprise Apps |
|  | DevOps Applied to COST Systems |
|  | DevOps Applied to Manufactured Software Embedded Products |
|  | DevOps Applied to Software Services |
|  | Five Levels of Application Maturity |
|  | **CI/CD Pipeline Engineering Indicated in the Last Chapter…** |
|  | CI/CD Tools |
|  | CI/CD Toolchains to Realize Continuous Flow... |
|  | CI/CD with Multitier Applications… |
|  | CI/CD for Databases |
|  | CI/CD for Micro-services Pipelines Micro-Services Architectures… |
|  | The Complexity of Many Parallel Micro-services DevOps Pipelines |
|  | CI/CD Pipelines in the Clouds Considering the Global Movement of IT Infrastructures… |
|  | Five Levels of CI/CD Pipeline Maturity… |
|  | **DevOps Elastic Infrastructures** |
|  | Ephemeral Elastic Infrastructures DevOps Works Best… |
|  | Idempotency and Immutable Infrastructure… |
|  | Bare Metal, Virtual Machines, Containers, and Server-less The Workhorse of IT… |
|  | Infrastructure as Code (IAC)… |
|  | Infrastructure-as-Code Tools… |
|  | Net DevOps |
|  | Ad-Hoc Infrastructures |
|  | Private Data Centers… |
|  | Cloud Cost Management Recommended Engineering Practices |
|  | Cloud System Performance Recommended Engineering Practices |
|  | High-Availability Cloud Services Recommended Engineering Practices |
|  | Cloud Change Management Recommended Engineering Practices |
|  | Cloud Security and Compliance Recommended Engineering Practices |
|  | DevOps Hybrid Cloud |
|  | DevOps Hybrid Cloud Orchestration Tools |
|  | DevOps Multi-Cloud |
|  | DevOps Multi-Cloud Services… |
|  | Five Levels of Infrastructure Maturity… |
|  | **Continuous Test Engineering** |
|  | Why Is Continuous Test Engineering Important to DevOps |
|  | How Is Continuous Testing Engineered for DevOps |
|  | Dev Stage Continuous Test Assessment Examples |
|  | Integration Stage Continuous Test Assessment Examples |
|  | Pre-Prod Stage Continuous Test Assessment Examples |
|  | Post-Prod Stage Continuous Testing Assessment Examples |
|  | Advanced Continuous Test Engineering |
|  | **Continuous Monitoring Engineering** |
|  | Why Is Continuous Monitoring Engineering Important to DevOps? |
|  | How Continuous Monitoring Is Engineered for DevOps? |
|  | Engineering Continuous Monitoring for Applications |
|  | Engineering Continuous Monitoring for Pipelines |
|  | Engineering Continuous Monitoring for Infrastructures |
|  | **Continuous Delivery and Deployment Engineering** |
|  | Why Is Continuous Delivery and Deployment Important to Engineering DevOps? |
|  | How Is Continuous Delivery and Deployment Engineered? |
|  | Blue-Green Deployments… |
|  | Dark Launching Release Strategy… |
|  | Feature Toggles and A/B Test Strategy… |
|  | Feature Flag Roll-Out Deployments… |
|  | Canary Deployments |
|  | Deployment Database Changes… |
|  | Micro-services Deployments Best Practice… |
|  | Deploying Containers with Kubernetes… |
|  | **Part-4: Transformation Engineering Blueprint** |
|  | **DevOps Seven-Step Transformation Engineering Blueprint** |
|  | **Step One: Visioning** |
|  | Why is the Visioning Step Important to DevOps Engineering? |
|  | How is the Visioning Step Accomplished? |
|  | Overcoming Challenges with the Visioning Step… |
|  | **Step Two: Alignment** |
|  | Why is the Alignment Step Important to Engineering DevOps? |
|  | How is the Alignment Step Accomplished? |
|  | Overcoming Challenges with the Alignment Step |
|  | **Step Three: Assessment** |
|  | Why Is the Assessment Step Important to Engineering DevOps |
|  | How is the Assessment Step Accomplished? |
|  | Discover Current State |
|  | Assess the Maturity of DevOps Practices |
|  | Create a Current State Value-Stream Map |
|  | Align Priorities for Solution Requirements |
|  | Overcoming Challenges with the Assessment Step |
|  | **Step Four: Solution** |
|  | Why is the Solution Step Important to Engineering DevOps? |
|  | How Is the Solution Step Accomplished? |
|  | Create a Future State Value-Stream Map… |
|  | Road-Mapping DevOps Transformation… |
|  | Estimate ROI Business Managers will Not Likely Approve a Solution Unless It Will Yield a ROI. |
|  | Solution Recommendation Alignment… |
|  | Overcoming Challenges with the Solution Step Estimates Required for Completing… |
|  | **Step Five: Realize** |
|  | Why is the Realize Step Important to Engineering DeOps? |
|  | How is the Realize Step Accomplished? |
|  | Task Level Planning |
|  | Proof of Concept (POC) Trials |
|  | Implementation |
|  | Release to Production |
|  | Training |
|  | Governance |
|  | Overcoming Challenges with the Realize Step |
|  | **Step Six: Operationalize** |
|  | Why is the Operationalize Step Important to Engineering DevOps? |
|  | How is the Operationalize Step Accomplished? |
|  | Controlled Access |
|  | Monitoring |
|  | Governance |
|  | Support |
|  | Evolution |
|  | Overcoming Challenges with the Operationalize Step |
|  | **Step Seven: Expansion** |
|  | Why is the Expansion Step Important to Engineering DevOps? |
|  | How is the Expansion Step Accomplished? |
|  | DevOps Continuous Flow Model Evolutions… |
|  | Mastering DevOps Maturity Level 4 – Second Way (Continuous Feedback)… |
|  | Mastering DevOps Maturity Level 5 – Third Way (Continuous Improvement)… |
|  | Beyond DevOps Maturity Level 5 – Continuous Autonomous Improvement… |
|  | **Future of Engineering DevOps – Beyond Continuous Improvement…** |
|  | **Continuous Learning** |
|  | Learning Continuous Flow… |
|  | Why is Learning Continuous Flow Important to Engineering DevOps? |
|  | How is Learning Continuous Flow Accomplished? |
|  | What is Needed to Implement Learning for Continuous Flow? |
|  | Learning Continuous Feedback… |
|  | Why is Learning Continuous Feedback Important to Engineering DevOps? |
|  | How is Learning Continuous Feedback Accomplished? |
|  | What is Needed to Implement Learning for Continuous Feedback? |
|  | Learning Continuous Improvement… |
|  | Why is Learning Continuous Feedback Important to Engineering DevOps? |
|  | How is Learning Continuous Feedback Accomplished? |
|  | **Learning DevOps** |
|  | **Section-01: DevOps and Infrastructure as Code** |
|  | **DevOps Culture and Practice** |
| 01 | Getting Started with DevOps |
|  | Implementing CI/CD and Continuous Deployment – Topics 4 |
|  | Understanding IaC Practices – Topics 10 |
|  | Summary |
|  | Questions |
|  | Further Reading |
|  | **Provisioning Cloud Infrastructure with Terraform** |
|  | Technical Requirements |
|  | Installing Terraform – Topics 6 |
|  | Configuring Terraform for Azure – Topics 3 |
|  | Writing a Terraform Script to Deploy Azure Infrastructure – Topics 4 |
|  | Deploying the Infrastructure with Terraform – Topics 3 |
|  | Terraform Command Lines and Life Cycle – Topics 5 |
|  | Protecting tfstate in a Remote Backend |
|  | Summary |
|  | Questions |
|  | Further Reading |
|  | **Using Ansible for Configuring IaaS Infrastructure** |
|  | Technical Requirements |
|  | Installing Ansible – Topics 4 |
|  | Creating an Inventory for Targeting Ansible Host – Topics 3 |
|  | Wrting the First Playbook – Topics 3 |
|  | Executing Ansible – Topics 3 |
|  | Protecting Data with Ansible Vault – Topics 2 |
|  | Using a Dynamic Inventory for Azure Infrastructure |
|  | Summary |
|  | Questions |
|  | Further Reading |
|  | **Optimizing Infrastructure Deployment with Packer** |
|  | Technical Requirements |
|  | An Overview of Packer – Topics 8 |
|  | Creating Packer Templates for Azure VMs with Scripts – Topics 5 |
|  | Using Ansible in a Packer Template – Topics 2 |
|  | Executing Packer – Topics 3 |
|  | Using a Packer Image with Terraform |
|  | Summary |
|  | Questions |
|  | Further Reading |
|  | **Section-02: DevOps CI/CD Pipeline** |
|  | **Managing Your Source Code with Git** |
|  | Technical Requirements |
|  | Overviewing Git and Its Command Lines – Topics 4 |
|  | Overviewing Git and Its Command Lines – Topics 4 |
|  | Overviewing Git and Its Command Lines – Topics 4 |
|  | Understanding the GIt Process and GitFlow Pattern – Topics 4 |
|  | Understanding the GIt Process and GitFlow Pattern – Topics 4 |
|  | Summary |
|  | Questions |
|  | Further Reading |
|  | **Continuous Integration and Continuous Delivery** |
|  | Technical Requirements |
|  | The CI/CD Principles – Topics 2 |
|  | Using a Package Manger – Topics 3 |
|  | Using Jenkins – Topics 4 |
|  | Using Azure Pipelines – Topics 3 |
|  | Using GitLab CI – Topics 4 |
|  | Summary |
|  | Questions |
|  | Further Reading |
|  | **Section-03: Containerized Applications with Docker and Kubernetes** |
|  | **Containerizing Your Application with Docker** |
|  | Technical Requirements |
|  | Installing Docker – Topics 3 |
|  | Creating a Dockerfile – Topics 2 |
|  | Building and Running a Container on a Local Machine – Topics 3 |
|  | Pushing an Image to Docker Hub |
|  | Deploying a Container to ACI with a CI/CD Pipeline – Topics 2 |
|  | Summary |
|  | Questoins |
|  | Further Reading |
|  | **Managing Containers Effectively with Kubernetes** |
|  | Technical Requirements |
|  | Installing Kubernetes – Topics 3 |
|  | First Example of Kubernetes Application Deployment |
|  | Using HELM as a Package Manger |
|  | Using AKS – Topics 3 |
|  | Creating a CI/CD Pipeline for Kubernetes with Azure Pipelines – Topics 2 |
|  | Summary |
|  | Questions |
|  | Further Reading |
|  | **Section-04: Testing Your Application** |
|  | **Testing APIs with Postman** |
|  | Technical Requirements |
|  | Creating a Postman Collection with Request – Topics 3 |
|  | Using Environments and Variable to Dynamize Requests |
|  | Writing Postman Tests |
|  | Executing Postman Request Tests Locally |
|  | Understanding the Newman Concept |
|  | Preparing Postman Collections for Newman – Topics 2 |
|  | Running the Newman Command Line |
|  | Integration of Newman in the CI/CD Pipeline Process – 5 |
|  | Summary |
|  | Questions |
|  | Further Reading |
|  | **Static Code Analysis with SonarQube** |
|  | Technical Requirements |
|  | Exploring SonarQube |
|  | Installing SonarQube – Topics 5 |
|  | Real-time Analysis with SonarLint |
|  | Executing SonarQUbe in Continuous Integration – Topics 2 |
|  | Summary |
|  | Questions |
|  | Further Reading |
|  | **Security and Performance Tests** |
|  | Technical Requirements |
|  | Applying Web Security and Penetration Testing with ZAP – Topic 2 |
|  | Running Performance Tests with Postman |
|  | Summary |
|  | Questions |
|  | Further Reading |
|  | **Section-05: Taking DevOps Further** |
|  | **Security in the DevOps Process with DevSecOps** |
|  | Technical Requirements |
|  | Testing Azure Infrastructure Compliance with Chef InSpec – 7 |
|  | Using the Secure DevOps Kit for Azure – Topics 3 |
|  | Preserving Data with HashiCorp’s Vault – Topics 6 |
|  | Summary |
|  | Questions |
|  | Further Reading |
|  | **Reducing Deployment Downtime** |
|  | Technical Requirements |
|  | Reducing Deployment Downtime with Terraform |
|  | Understanding Blue-green Deployment Concepts and Patterns – Topics 3 |
|  | Applying Blue-Green Deployments on Azure – Topics 2 |
|  | Introducing Feature Flags |
|  | Using an Open Source Framework for Feature Flags |
|  | Using the LaunchDarkly Solution |
|  | Summary |
|  | Questions |
|  | Further Reading |
|  | **DevOps for Open Source Projects** |
|  | Technical Requirements |
|  | Storing the Source Code in GitHub – Topics 2 |
|  | Contributing Using Pull Requests |
|  | Managing the Changelog and Release Notes |
|  | Sharing Binaries in GitHub Releases |
|  | Using Travis CI for Continuous Integration |
|  | Getting Started with GitHub Actions |
|  | Analyzing Code with SonarCloud |
|  | Detecting Security Vulnerabilities with WhiteSOurce Bold |
|  | Summary |
|  | Questions |
|  | Further Reading |
|  | **DevOps Best Practices** |
|  | Automating Everything |
|  | Choosing the Right Tool |
|  | Writing All Your Configuration in Code |
|  | Designing the System Architecture |
|  | Building a Good CI/CD Pipeline |
|  | Integrating Tests |
|  | Applying Security with DevSecOps |
|  | Monitoring Your System |
|  | Evolving Project Management |
|  | Summary |
|  | Questions |
|  | Further Reading |
|  | **DevOps for Developers** |
|  | **Part-01: Fundamentals** |
|  | **Beginning DevOps for Developers** |
| 01 | The Definition for DevOps – Topics 4 |
|  | What DevOps is Not – Topics 2 |
|  | Structure of This Book |
|  | Conclusion |
|  | **Introducing DevOps** |
|  | Traditional Project Settings |
|  | Agile Project Settings |
|  | Blame Game: Dev vs. Ops – Topics 3 |
|  | Operations as Bottleneck – Topics 2 |
|  | DevOps to the Rescue |
|  | The Essence of DevOps – Topics 3 |
|  | Conclusion |
|  | **Building Blocks of DevOps** |
|  | Measurement and Metrics – Topics 2 |
|  | Improving Flow of Features – Topics 2 |
|  | Improve and Accelerate Delivery – Topics 2 |
|  | Conclusion |
|  | **Part-02: Metrics and Measurement View** |
|  | **Quality and Testing** |
|  | What is Quality? – Topics 1 |
|  | Patterns for Improving Quality – Topics 5 |
|  | Conclusion |
|  | **Introduce Shared Incentives** |
|  | War Study: Magic Kingdoms |
|  | What is a Team? – Topics 2 |
|  | Becoming a Team – Topics 2 |
|  | Success Stories – Topics 2 |
|  | Conclusion |
|  | **Part-03: Process View** |
|  | **Gain Fast Feedback** |
|  | The DevOps Area Matrix |
|  | Extend Development to Operations |
|  | Extend Operations to Development |
|  | Embed Development into Operations |
|  | Embed Operations into Development |
|  | Starting with Kanban – Topics 3 |
|  | Example Use Case – Topics 2 |
|  | Conclusion |
|  | **Unified and Holistic Approach** |
|  | Getting Started with Concepts – Topics 1 |
|  | Origins of Conceptual Deficits – Topics 4 |
|  | Attributes of a Unified Approach – Topics 3 |
|  | Conclusion |
|  | **Part-04: Technical View** |
|  | **Automatic Releasing** |
|  | Prerequisites for Automatic Releasing |
|  | Patterns with Appropriate Tools – Topics 7 |
|  | Conclusion |
|  | **Infrastructure as Code** |
|  | Starting with Infrastructure as Code – Topics 2 |
|  | Test Environments with Vagrant – Topics 4 |
|  | Provisioning with Puppet – Topics 2 |
|  | Use Case: Open Source Infrastructure with Puppet – Topics 2 |
|  | Where to Look Next? – Topics 1 |
|  | Conclusion |
|  | Specification by Example |
|  | Getting Started with Acceptance Tests – Topics 1 |
|  | Defining Your Acceptance Criteria – Topics 8 |
|  | Reporting on the Test Outcomes – Topics 1 |
|  | Conclusion |
|  | Moving On |

# **Cloud Computing and Virtualization**

* Cloud Computing: Concepts, Technology and Architecture, Thomas Erl, Zaigham, and Ricardo
* Virtualization Essential, Matthew Portnoy

|  |  |
| --- | --- |
|  | **Cloud Computing** |
|  | **Introduction** |
| 01 | Objectives of This Book |
|  | What This Book Does Not Cover |
|  | Who This Book is for |
|  | How This Book is Organized |
|  | Part-1: Fundamental Cloud Computing |
|  | Understanding Cloud Computing |
|  | Fundamental Concepts and Models |
|  | Cloud-Enabling Technology |
|  | Fundamental Cloud Security |
|  | Part-2: Cloud Computing Mechanisms |
|  | Cloud Infrastructure Mechanisms |
|  | Specialized Cloud Mechanisms |
|  | Cloud Management Mechanisms |
|  | Cloud Security Mechanisms |
|  | Part-3: Cloud Computing Architecture |
|  | Fundamental Cloud Architectures |
|  | Advanced Cloud Architectures |
|  | Specialized Cloud Architectures |
|  | Part-4: Working with Clouds |
|  | Cloud Delivery Model Considerations |
|  | Cost Metrics and Pricing Models |
|  | Service Quality Metrics and SLAs |
|  | Part-5: Appendices |
|  | Case Study Conclusions |
|  | Mapping Mechanisms to Characteristics |
|  | Data Center Facilities (TIA-942) |
|  | Emerging Technologies |
|  | Cloud Provisioning Contracts |
|  | Cloud Business Case Template |
|  | **Case Study Background** |
|  | Case Study 1: ATN |
|  | Technical Infrastructure and Environment |
|  | Business Goals and New Strategy |
|  | Roadmap and Implementation Strategy |
|  | Case Study 2: DTGOV |
|  | Technical Infrastructure and Environment |
|  | Business Goals and New Strategy |
|  | Roadmap and Implementation Strategy |
|  | Case Study 3: Innovartus Technologies Inc. |
|  | Technical Infrastructure and Environment |
|  | Business Goals and Strategy |
|  | Roadmap and Implementation Strategy |
|  | **Part-01: Fundamental Cloud Computing** |
|  | **Understanding Cloud Computing** |
|  | Origins and Influences |
|  | A Brief History |
|  | Definition |
|  | Business Drivers – Topics 3 |
|  | Technology Innovations – Topics 4 |
|  | Basic Concepts and Terminology |
|  | Cloud |
|  | IT Resource |
|  | On-Premise |
|  | Cloud Consumers and Cloud Providers |
|  | Scaling – Topics 2 |
|  | Cloud Service |
|  | Cloud Service Consumer |
|  | Goals and Benefits |
|  | Reduced Investments and Proportional Cost |
|  | Increased Scalability |
|  | Increased Availability and Reliability |
|  | Risks and Challenges |
|  | Increased Security Vulnerabilities |
|  | Reduced Operational Governance Control |
|  | Limited Portability Between Cloud Providers |
|  | Multi-Regional Compliance and Legal Issues |
|  | **Fundamental Concepts and Models** |
|  | Roles and Boundaries |
|  | Cloud Provider |
|  | Cloud Consumer |
|  | Cloud Service Owner |
|  | Cloud Resource Administrator |
|  | Additional Roles |
|  | Organizational Boundary |
|  | Trust Boundary |
|  | Cloud Characteristics |
|  | On-Demand Usage |
|  | Ubiquitous Access |
|  | Multitenancy (and Resource Pooling) |
|  | Elasticity |
|  | Measured Usage |
|  | Resiliency |
|  | Cloud Delivery Models |
|  | Infrastructure-as-a-Service (IaaS) |
|  | Platform-as-a-Service (PaaS) |
|  | Software-as-a-Service (SaaS) |
|  | Comparing Cloud Delivery Models |
|  | Combining Cloud Delivery Models – Topics 2 |
|  | Cloud Deployment Models |
|  | Public Clouds |
|  | Community Clouds |
|  | Private Clouds |
|  | Hybrid Clouds |
|  | Other Cloud Deployment Models |
|  | **Cloud-Enabling Technology** |
|  | Broadband Networks and Internet Architecture |
|  | Internet Service Providers (ISPs) |
|  | Connectionless Packet Switching (Datagram Networks) |
|  | Router-Based Interconnectivity – Topics 3 |
|  | Technical and Business Considerations – Topics 3 |
|  | Data Center Technology |
|  | Virtualization |
|  | Standardization and Modularity |
|  | Automation |
|  | Remote Operation and Management |
|  | High Availability |
|  | Security-Aware Design, Operation, and Management |
|  | Facilities |
|  | Computing Hardware |
|  | Storage Hardware |
|  | Network Hardware – Topics 5 |
|  | Other Considerations |
|  | Virtualization Technology |
|  | Hardware Independence |
|  | Server Consolidation |
|  | Resource Replication |
|  | Operating System-Based Virtualization |
|  | Hardware-Based Virtualization |
|  | Virtualization Management |
|  | Other Considerations |
|  | Web Technology |
|  | Basic Web Technology |
|  | Web Application |
|  | Multitenant Technology |
|  | Service Technology |
|  | Web Services |
|  | REST Services |
|  | Service Agents |
|  | Service Middleware | Case Study Example |
|  | **Fundamental Cloud Security** |
|  | Basic Terms and Concepts |
|  | Confidentiality |
|  | Integrity |
|  | Authenticity |
|  | Availability |
|  | Threat |
|  | Vulnerability |
|  | Risk |
|  | Security Controls |
|  | Security Mechanisms |
|  | Security Policies |
|  | Threat Agents |
|  | Anonymous Attacker |
|  | Malicious Service Agent |
|  | Trusted Attacker |
|  | Malicious Insider |
|  | Cloud Security Threats |
|  | Traffic Eavesdropping |
|  | Malicious Intermediary |
|  | Denial of Service |
|  | Insufficient Authorization |
|  | Virtualization Attack |
|  | Overlapping Trust Boundaries |
|  | Additional Considerations |
|  | Flawed Implementations |
|  | Security Policy Disparity |
|  | Contracts |
|  | Risk Management | Case Study Example |
|  | **Part-02: Cloud Computing Mechanisms** |
|  | **Cloud Infrastructure Mechanisms** |
|  | Logical Network Perimeter | Case Study Example |
|  | Virtual Server | Case Study Example |
|  | Cloud Storage Device |
|  | Cloud Storage Levels |
|  | Network Storage Interfaces |
|  | Object Storage Interfaces |
|  | Database Storage Interfaces – Topics 2 |
|  | Case Study Example |
|  | Cloud Usage Monitor |
|  | Monitoring Agent |
|  | Resource Agent |
|  | Polling Agent | Case Study Example |
|  | Resource Replication | Case Study Example |
|  | Ready-Made Environment | Case Study Example |
|  | **Specialized Cloud Mechanisms** |
|  | Automated Scaling Listener | Case Study Example |
|  | Load Balancer | Case Study Example |
|  | SLA Monitor | Case Study Example – Topics 2 |
|  | Pay-Per-Use Monitor | Case Study Example |
|  | Audit Monitor | Case Study Example |
|  | Failover System |
|  | Active-Active | Case Study Example |
|  | Hypervisor | Case Study Example |
|  | Resource Cluster | Case Study Example |
|  | Multi-Device Broker | Case Study Example |
|  | State Management Database | Case Study Example |
|  | **Cloud Management Mechanisms** |
|  | Remote Administration System | Case Study Example |
|  | Resource Management System | Case Study Example |
|  | SLA Management System | Case Study Example |
|  | Billing Management System | Case Study Example |
|  | **Cloud Security Mechanisms** |
|  | Encryption |
|  | Symmetric Encryption |
|  | Asymmetric Encryption | Case Study Example |
|  | Hashing | Case Study Example |
|  | Digital Signature | Case Study Example |
|  | Public Key Infrastructure (PKI) | Case Study Example |
|  | Identity and Access Management (IAM) | Case Study Example |
|  | Single Sign-On (SSO) | Case Study Example |
|  | Cloud-Based Security Groups | Case Study Example |
|  | Hardened Virtual Server Images | Case Study Example |
|  | **Part-03: Cloud Computing Architecture** |
|  | **Fundamental Cloud Architectures** |
|  | Workload Distribution Architecture |
|  | Resource Pooling Architecture |
|  | Dynamic Scalability Architecture |
|  | Elastic Resource Capacity Architecture |
|  | Service Load Balancing Architecture |
|  | Cloud Bursting Architecture |
|  | Elastic Disk Provisioning Architecture |
|  | Redundant Storage Architecture Fundamental Cloud Architectures |
|  | **Advanced Cloud Architectures** |
|  | Hypervisor Clustering Architecture |
|  | Load Balanced Virtual Server Instances Architecture |
|  | Non-Disruptive Service Relocation Architecture |
|  | Zero-Disruptive Service Relocation Architecture |
|  | Cloud Balancing Architecture |
|  | Resource Reservation Architecture |
|  | Dynamic Failure Detection and Recovery Architecture |
|  | Bare-Metal Provisioning Architecture |
|  | Repaid Provisioning Architecture |
|  | Storage Workload Management Architecture |
|  | Case Study Example |
|  | Specialized Cloud Architectures |
|  | Direct I/O Access Architecture |
|  | Direct LUN Access Architecture |
|  | Dynamic Data Normalization Architecture |
|  | Elastic Network Capacity Architecture |
|  | Cross-Storage Device Vertical Tiering Architecture |
|  | Intra-Storage Device Vertical Tiering Architecture |
|  | Load Balanced Virtual Switches Architecture |
|  | Multipath Resource Access Architecture |
|  | Persistent Virtual Network Configuration Architecture |
|  | Redundant Physical Connection for Virtual Servers Architecture |
|  | **Part-04: Working with Clouds** |
|  | **Cloud Delivery Model Considerations** |
|  | Cloud Delivery Models: The Cloud Provider Perspective |
|  | Building IaaS Environments – Topics 4 |
|  | Equipping PaaS Environments – Topics 3 |
|  | Optimizing SaaS Environments | Security |
|  | **Cloud Delivery Models: The Cloud Consumer Perspective** |
|  | Working with IaaS Environments |
|  | IT Resource Provisioning Considerations |
|  | Working with PaaS Environments |
|  | IT Resource Provisioning Considerations |
|  | Working with SaaS Services |
|  | Case Study Example |
|  | **Cost Metrics and Pricing Models** |
|  | Business Cost Metrics |
|  | Up-Front and On-Going Costs |
|  | Additional Costs | Case Study Example |
|  | Product Catalog Browser – Topics 4 |
|  | Client Database – Topics 4 |
|  | Cloud Usage Cost Metrics |
|  | Network Usage – Topics 3 |
|  | Server Usage – Topics 2 |
|  | Cloud Storage Device Usage – Topics 2 |
|  | Cloud Service Usage – Topics 3 |
|  | Cost Management Considerations |
|  | Pricing Models |
|  | Additional Considerations | Case Study Example |
|  | Virtual Server On-Demand Instance Allocation |
|  | Virtual Server Reserved Instance Allocation |
|  | Cloud Storage Device |
|  | WAN Traffic |
|  | **Service Quality Metrics and SLAs** |
|  | Service Quality Metrics |
|  | Service Availability Metrics – Topics 2 |
|  | Service Reliability Metrics – Topics 2 |
|  | Service Performance Metrics – Topics 7 |
|  | Service Scalability Metrics – Topics 3 |
|  | Service Resiliency Metrics – Topics 2 |
|  | Case Study Example |
|  | SLA Guidelines |
|  | Case Study Example – Topics 5 |

# **UML**

* Software Engineering with UML, Bhuvan Unhelkar
* Software Development with UML, Ken Lunn

|  |  |
| --- | --- |
|  | **Software Engineering with UML** |
|  | **Software Engineering Fundamentals with Object Orientation** |
| 01 | Learning Objectives |
|  | Introduction to Software Engineering |
|  | Learning and Adopting Software Engineering |
|  | Importance of Modeling |
|  | Software Engineering Fundamentals – Topics 2 |
|  | Classification (Grouping) |
|  | Abstraction (Representing) |
|  | Encapsulation (Modularizing) |
|  | Association (Relating) |
|  | Inheritance (Generalizing) |
|  | Polymorphism (Executing) |
|  | Software Engineering: A Historical Perspective | Evolution of Modeling |
|  | About the UML and Its Purpose | UML Usage |
|  | Common Errors in Interpreting Software Engineering Fundamentals and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | Endnotes |
|  | **Review of 14 Unified Modeling Language Diagrams** |
|  | Learning Objectives |
|  | List and Nature of UML Diagrams |
|  | Nature and Basics of UML Diagrams |
|  | Brief Review of UML Diagrams |
|  | Use Case Diagrams |
|  | Activity Diagrams |
|  | Class Diagrams |
|  | Sequence Diagrams |
|  | Interaction Overview Diagrams |
|  | Communication Diagrams |
|  | Object Diagrams |
|  | State Machine Diagram |
|  | Composite Structure Diagrams |
|  | Component Diagrams |
|  | Deployment Diagrams |
|  | Package Diagrams |
|  | Timing Diagrams |
|  | Profile Diagrams |
|  | Difference in List of UML Diagrams |
|  | Common Errors in Understanding UML Diagrams and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | Endnotes |
|  | **Software Projects and Modeling Spaces: Package Diagrams** |
|  | Learning Objectives |
|  | Understanding Different Types of Sizes of UML-Based Projects – Topics 2 |
|  | Organizing the Project – Topics 3 |
|  | The Three Modeling Spaces in Software Engineering – Topics 3 |
|  | Mapping UML to Modeling Spaces |
|  | Package Diagrams – Topics 5 |
|  | Common Errors in Organizing Project Packages and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | Endnotes |
|  | **The Software Development Life Cycle and Agility** |
|  | Learning Objectives |
|  | Process in Developing Software |
|  | UML and Process |
|  | Process Elements |
|  | Software Development Life Cycles |
|  | Iterative, Incremental, and Parallel Process in Software Development – Topics 4 |
|  | Agile in Software Development – Topics 2 |
|  | Roles, Ceremonies, and Artifacts – Topics 4 |
|  | Disciplined Agile Development |
|  | Composite Agile Method and Strategy |
|  | Common Errors in SDLC and Agile Use and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | Endnotes |
|  | **Use Case Models-1: Actors and Use Cases** |
|  | Learning Objectives |
|  | Use Case Modeling in the Problem Space |
|  | Actors – Topics 5 |
|  | Clarifying Actor – Class Confusion |
|  | Actor Documentation – Topics 2 |
|  | Use Cases – Topics 5 |
|  | Example: Use Cases in the Hospital Management System – Topics 6 |
|  | Strengths and Weaknesses of Use Cases and Actors – Topics 2 |
|  | Relating Use Cases to Packages |
|  | Relating Use Cases to Functional Testing |
|  | Common Errors in Modeling Actors and Use Cases and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | Endnotes |
|  | **Use Case Models-2: Use Case Diagrams and Requirements Modeling** |
|  | Learning Objectives |
|  | Use Case Diagrams – Topics 6 |
|  | Use Case Relationships – Topics 3 |
|  | Naming a Use Case Diagram |
|  | Use case Diagrams for Hospital Management System – Topics 4 |
|  | Strengths and Weaknesses of Use Case Diagrams – Topics 2 |
|  | Common Errors in Use Case Diagrams and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | Endnotes |
|  | **Activity Diagrams, Interaction Overview Diagrams, and Business Process Models** |
|  | Learning Objectives |
|  | Introduction |
|  | Activity Diagrams – Topics 2 |
|  | Activity Diagrams for Hospital Management System – Topics 4 |
|  | Strengths and Weakness of Activity Diagrams – Topics 2 |
|  | Interaction Overview Diagrams – Topics 4 |
|  | Strength and Weaknesses of Interaction Overview Diagrams – Topics 2 |
|  | Business Process Modeling |
|  | Common Errors in Activity Diagrams, Interaction Overview Diagrams, and Business Process Models… |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | **Class Models-1: Classes and Business Entities** |
|  | Learning Objectives |
|  | Understanding Business Entities, Classes, and Objects |
|  | Classes and Business Entities |
|  | Identifying and Naming Classes – Topics 2 |
|  | Analyzing the “Registers Patient” Use Case to Identify Classes/Business Entities |
|  | Class Definitions – Topics 6 |
|  | Visibilities on a Class |
|  | Designing a Class in the Solution Space |
|  | Class Identification in Design (MOSS) |
|  | Strengths and Weaknesses of Classes – Topics 2 |
|  | Common Errors in Classes and Business Entities and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | **Class Model-2: Basic Class Diagram** |
|  | Learning Objectives |
|  | Class Diagrams |
|  | Notations of Class Diagrams |
|  | Inheritance Relationship in a Class Diagram |
|  | Association Relationship in a Class Diagram |
|  | Aggregation Relationship in a Class Diagram |
|  | Multiplicities in Class Diagrams |
|  | Class Diagrams for Hospital Management System – Topics 4 |
|  | Strengths of Class Diagrams – Topics 2 |
|  | Common Errors in Basic Class Diagram and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | **UML’s Extensibility Mechanisms: Notes, Stereotypes, Constraints, and Tags** |
|  | Learning Objectives |
|  | UML’s Extensibility Mechanisms |
|  | Notes |
|  | Stereotypes – Topics 8 |
|  | Stereotypes for Attributes and Operations – Topics 6 |
|  | Profile Diagram |
|  | Constraints |
|  | Tagged Value |
|  | Common Errors in UML’s Extensibility Mechanisms and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | Endnote |
|  | **Class Model-3: Advanced Class Designs** |
|  | Learning Objectives |
|  | Introduction |
|  | Understanding Class Relationships – Topics 2 |
|  | Advanced Relationships in a Class Diagram in Design |
|  | Association Relationship in Design |
|  | Dependency Relationship in Design |
|  | Interface and Realization Relationship in Design |
|  | Aggregation Relationship in Design |
|  | Implementing the Relationships: By References and By Value |
|  | Parameter Visibility |
|  | Multiplicities and Object Diagrams – Topics 3 |
|  | Inheritance and Polymorphism in Design – Topics 2 |
|  | Incorporating Errors and Exceptions in Design |
|  | Attribute Identification, Naming, and Definition – Topics 5 |
|  | Operation Identification, Naming, and Signature – Topics 3 |
|  | Common Errors in Modeling Advance Class Designs and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | **Interaction Modeling with Sequence Diagrams** |
|  | Learning Objectives |
|  | Interaction Modeling |
|  | About Sequence Diagrams |
|  | Sequence Diagrams in Detail – Topics 6 |
|  | Sequence Diagrams in Hospital Management System |
|  | Sequence Diagrams in the Problem Space |
|  | Design-Level Sequence Diagrams in the Solution Space – Topics 4 |
|  | Strengths and Weaknesses of Sequence Diagrams |
|  | Common Errors in Interaction Modeling with Sequence Diagrams and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | **Database Modeling with Class and Sequence Diagrams** |
|  | Learning Objectives |
|  | Introduction to Persistence |
|  | Persistence Mechanisms – Databases – Topics 4 |
|  | Using Relational Databases in Object-Oriented Designs – Topics 3 |
|  | Robustness in Persistence Design – Topics 2 |
|  | Inheritance Relationship and Relational Tables |
|  | Mapping Associations in Relational Tables – Topics 3 |
|  | Persistence in Practice for HMS – Topics 2 |
|  | Incorporating Database Interface Pattern in HMS Persistence Design |
|  | Common Errors in Interpreting Database Modeling and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | Endnote |
|  | **Dynamic Modeling with State Machine Diagrams** |
|  | Learning Objectives |
|  | Introduction to Dynamic Modeling with State Machine Diagrams |
|  | State Machine Diagrams for Dynamic Modeling |
|  | Notations for State Machine Diagrams |
|  | State Machine Diagrams for Patient Object in Problem Space – Topics 3 |
|  | Advanced State Machine Diagram for Patient Object in HMS in Solution Space – Topics 4 |
|  | Common Errors in Modeling State Machine Diagrams and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | Endnote |
|  | **Advanced Software Engineering Design Concepts: Reuse, Granularity, Patterns, and Robustness** |
|  | Learning Objectives |
|  | Introduction |
|  | Reusability in Software Engineering – Topics 4 |
|  | Reuse Strategies in Software Projects – Topics 3 |
|  | Granularity in Object-Oriented Design |
|  | Design Patterns in Software Design Engineering – Topics 4 |
|  | Robustness in Design – Topics 4 |
|  | System Architecture and Design Process |
|  | Common Error in Reuse, Granularity, Patterns, and Robustness and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | Endnotes |
|  | **Interface Specifications Prototyping** |
|  | Learning Objectives |
|  | Introduction to Interfaces |
|  | Specifying Interface Requirements |
|  | Interface Specifications of HMS – Topics 3 |
|  | Examples of User Interface Designs for HMS (Initial Iteration) |
|  | Specifying the Flow of User Interfaces (HMS Example) |
|  | Mobile Applications Interfaces |
|  | Printer Interfaces |
|  | User Interface Design Considerations – Topics 3 |
|  | Prototyping – Topics 4 |
|  | Common Errors in Interface Specifications and Prototyping and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | Endnotes |
|  | **Implementation Modeling with Component, Deployment, and Composite Structure Diagrams** |
|  | Learning Objectives |
|  | Introduction |
|  | Component Diagrams – Topics 5 |
|  | Component Diagrams for HMS |
|  | Practical Component Diagram Showing Interdependencies and Packages for HMS |
|  | Strengths and Weaknesses of Component Diagram |
|  | Composite Structure Diagram |
|  | Deployment Diagrams |
|  | UML Notations on a Deployment Diagram |
|  | Process Around Implementation Diagrams |
|  | Common Errors in Implementation Modeling with Component, Deployment, and Composite Structure… |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | Endnote |
|  | **Quality of UML Models with Syntax, Semantic, and Aesthetic Checks** |
|  | Learning Objectives |
|  | Introduction |
|  | Quality Management, Assurance, and Control (Testing) – Topics 2 |
|  | Syntax, Semantics, and Aesthetics Verify and Validate Artifacts, Diagrams, and Models – Topics 4 |
|  | Quality Techniques and V&V Checks – Topics 4 |
|  | Common Errors in Quality Assurance and Testing of UML Models and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | Endnote |
|  | **Software Testing: Plan, Design and Execute** |
|  | Learning Objectives |
|  | Introduction – Topics 3 |
|  | Organizing the Testing of Software – Topics 3 |
|  | Test Approaches – Topics 4 |
|  | Test Architecture |
|  | Test Designs – Topics 4 |
|  | Test Cases in Solution Space – Topics 3 |
|  | Acceptance Test Cases for Hospital Management System – Topics 6 |
|  | Class-Based Approach to Test Cases in the Solution Space – Topics 2 |
|  | Operational (NFR) Testing |
|  | Some Operational Tests |
|  | Common Errors in Testing in Solution Space and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | Endnotes |
|  | **Nonfunctional (Operational) Requirements Specification and Application** |
|  | Learning Objectives |
|  | Nonfunctional (Operational) Requirements – Topics 4 |
|  | NFR Categories: Qualities and Constraints – Topics 2 |
|  | NFR Levels |
|  | Performance – Topics 3 |
|  | Scalability – Topics 2 |
|  | Volume |
|  | Operating System |
|  | Mobile OS |
|  | Accessibility |
|  | Reliability and Maintenance |
|  | Environment |
|  | Legal and Compliance |
|  | Security |
|  | Usability and User Experience – Topics 2 |
|  | Big Data (Velocity, Variety) |
|  | Cloud |
|  | Common Errors in Handling NFRs and How to Rectify Them |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | Endnotes |
|  | **Emerging Information Technologies and Modeling** |
|  | Learning Objectives |
|  | Emerging Information Technologies and Modeling |
|  | SMAC Significance |
|  | Service Orientation (Analytic, Utilities) |
|  | Internet of Things |
|  | Mobile and Social Media Applications |
|  | Cloud Integration |
|  | Virtual and Augmented Reality |
|  | Robotics and Machine Learning |
|  | Modeling the Not Only SQL Databases |
|  | Service Orientation Based on the Cloud |
|  | Designing with Services |
|  | Core Elements of Web Services |
|  | XML/SOAP |
|  | Web Services and Modeling – Topics 4 |
|  | Discussion Questions |
|  | Team Project Case Study |
|  | Endnotes |

# **Software Documentation**

* Docs for Developers: An Engineer’s Field Guide to Technical Writing, Jared Bhattin, Zachary, Jen, David, Heidi

|  |  |
| --- | --- |
|  | **Docs for Developers** |
|  | **Understanding Your Audience** |
| 01 | Corg.ly: One month to launch |
|  | The Curse of Knowledge |
|  | Creating and Initial Sketch of Your Users – Topics 3 |
|  | Validate Your User Understanding – Topics 2 |
|  | Condensing User Research Findings – Topics 3 |
|  | Creating a Friction Log |
|  | Summary |
|  | **Planning Your Documentation** |
|  | Corg.ly: Creating a Plan |
|  | Plans and Patterns |
|  | Content Types – Topics 7 |
|  | Planning Your Documentation |
|  | Summary |
|  | **Drafting Documentation** |
|  | Corg.ly: First Drafts |
|  | Confronting The Blank Page (or Screen) |
|  | Setting Yourself Up for Writing Success – Topics 3 |
|  | Creating Your Outline – Topics 2 |
|  | Creating Your Draft – Topics 5 |
|  | Writing for Skimming – Topics 4 |
|  | Getting Unstuck – Topics 5 |
|  | Working From Templates |
|  | Finishing Your First Draft |
|  | Summary |
|  | **Editing Documentation** |
|  | Corg.ly: Editing Content |
|  | Editing to Meet Your User’s Needs |
|  | Different Approaches to Editing – Topics 4 |
|  | Creating an Editing Process – Topics 3 |
|  | Receiving and Integrating Feedback |
|  | Giving Good Feedback |
|  | Summary |
|  | **Integrating Code Samples** |
|  | Corg.ly: Showing How It Works |
|  | Using Code Samples |
|  | Types of Code Samples |
|  | Principles of Good Code Samples – Topics 5 |
|  | Designing Code Samples – Topics 3 |
|  | Tooling for Code Samples – Topics 3 |
|  | Summary |
|  | **Adding Visual Content** |
|  | Corg.ly: Worth a Thousand Words |
|  | When Words aren’t Enough |
|  | Why Visual Content is Hard to Create – Topics 3 |
|  | Using Screenshots |
|  | Common Types of Diagrams – Topics 3 |
|  | Drawing Diagrams – Topics 7 |
|  | Creating Video Content |
|  | Reviewing Visual Content |
|  | Maintaining Visual Content |
|  | Summary |
|  | **Publishing Documentation** |
|  | Corg.ly: Ship it |
|  | Putting Your Content Out There |
|  | Building a Content Release Process |
|  | Creating a Publishing Timeline – Topics 4 |
|  | Planning for the future |
|  | Summary |
|  | **Gathering and Integrating Feedback** |
|  | Corg.ly: Initial Feedback |
|  | Listening to Your Users |
|  | Creating Feedback Channels – Topics 5 |
|  | Converting Feedback into Action – Topics 2 |
|  | Summary |
|  | **Measuring Documentation Quality** |
|  | Corg.ly: Tuesday After the Launch |
|  | Is My Documentation Any Good? |
|  | Understanding Documentation Quality – Topics 3 |
|  | Creating a Strategy for Analytics – Topics 3 |
|  | Tips for Using Document Metrics – Topics 5 |
|  | Summary |
|  | **Organizing Documentation** |
|  | Corg.ly: The Next Release |
|  | Organizing Documentation for Your Readers |
|  | Helping Your Readers Find Their Way – Topics 3 |
|  | Organizing Your Documentation – Topics 4 |
|  | Summary |
|  | **Maintaining and Deprecating Documentation** |
|  | Corg.ly: A Few Releases Later |
|  | Maintaining Up-to-Date Documentation |
|  | Planning for Maintainability – Topics 3 |
|  | Automating Documentation Maintenance – Topics 4 |
|  | Removing Content From Your Docset – Topics 2 |
|  | Summary |

# **Software Testing**

* Software Testing: Testing Across the Entire Software Development Life Cycle, Geraled D. Everett, Raymond

|  |  |
| --- | --- |
|  | **Software Testing** |
|  | **Overview of Testing** |
| 01 | Introduction |
|  | Objectives and Limits of Testing |
|  | The Value Versus Cost of Testing |
|  | Relationship of Testing to the Software Development Life Cycle |
|  | Tester Versus Developer Roles in Software Testing |
|  | Putting Software Testing in Perspective |
|  | Summary |
|  | **The Software Development Life Cycle** |
|  | Introduction |
|  | Methodologies and Tools |
|  | The Evolution of System Development Life Cycles |
|  | The Phased Development Methodology |
|  | The Preliminary Investigation Stage |
|  | The Analysis Stage |
|  | The Design Stage |
|  | The Preliminary Construction Stage |
|  | The Final Construction Stage |
|  | The Installation Stage |
|  | Putting Phased Development in Perspective |
|  | Summary |
|  | **Overview of Structured Testing** |
|  | Introduction |
|  | Checklist Mentality for Software Testers |
|  | SPRAE – A Generic Structured Testing Approach |
|  | Putting the Overview of Structured Testing in Perspective |
|  | **Testing Strategy** |
|  | Introduction |
|  | The Chess Pieces for Testing Strategies |
|  | The Two-Dimensional Testing Strategy Chess Board |
|  | The Three-Dimensional Testing Strategy Chess Board |
|  | Putting the Testing Strategy into Perspective |
|  | **Test Planning** |
|  | Introduction |
|  | The Test Plan |
|  | Test Cases |
|  | Writing Your Test Plan and Test Cases in the Real World |
|  | Test Document Standards |
|  | Putting Test Planning in Perspective |
|  | **Static Testing** |
|  | Introduction |
|  | Goal of Static Testing |
|  | Candidate Documents for Static Testing |
|  | Static Testing Techniques |
|  | Tracking Defects Detected by Static Testing |
|  | Putting Static Testing in Perspective |
|  | **Functional Testing** |
|  | Introduction |
|  | Functional Test Cases from Use Cases |
|  | An Approach to Functional Testing |
|  | An Approach to Regression Testing |
|  | Detailed White Box Testing Techniques |
|  | Detailed Black Box Testing Techniques |
|  | Summary |
|  | Putting Functional Testing in Perspective |
|  | **Structural (Non-Functional) Testing** |
|  | Introduction |
|  | Interface Testing |
|  | Security Testing |
|  | Installation Testing |
|  | The Smoke Test |
|  | Administration Testing |
|  | Backup and Recovery Testing |
|  | Putting Structural Testing in Perspective |
|  | Summary |
|  | **Performance Testing** |
|  | Introduction |
|  | Workload Planning Techniques |
|  | Workload Execution Techniques |
|  | Component Performance Testing |
|  | Round Trip Performance |
|  | Putting Performance Testing in Perspective |
|  | Summary |
|  | **The Testing Environment** |
|  | Introduction |
|  | Simulations |
|  | Benchmarking |
|  | Testing Environments |
|  | The Goal of a Testing Environment |
|  | Good Testing Environments and Why They Should Be Used |
|  | Bad Testing Environments and Why They Should Be Avoided |
|  | Putting the Testing Environment in Perspective |
|  | Summary |
|  | **Automated Testing Tools** |
|  | Introduction |
|  | Brief History of Automated Testing Tools for Software |
|  | Test Tool Record/Playback Paradigm |
|  | Test Tool Touchpoint Paradigms |
|  | Test Tool Execution Paradigm |
|  | The Benefits that Testing Tools Can Provide |
|  | The Liabilities that Testing Tools Can Impose |
|  | Putting Automated Testing Tools in Perspective |
|  | Summary |
|  | **Analyzing and Interpreting Test Results** |
|  | Introduction |
|  | Test Cases Attempted Versus Successful |
|  | Defect Discovery Focusing on Individual Defects |
|  | Defect Discovery Focusing on the Defect Backlog |
|  | Defect Discovery Focusing on Clusters of Defects |
|  | Prior Defect Discovery Pattern Usefulness |
|  | The Rayleigh Curve – Gunsights for Defect Discovery Patterns |
|  | More Defect Tracking Metrics |
|  | Putting Test Results in Perspective |
|  | Summary |
|  | **A Full Software Development Lifecycle Testing Project** |
|  | Introduction |
|  | Preliminary Investigation Stage |
|  | Analysis Stage |
|  | Design Stage |
|  | Preliminary Construction Stage |
|  | Final Construction Stage |
|  | Implementation Stage |
|  | Post Implementation Stage |
|  | Case Study Closure |
|  | **Testing Complex Applications** |
|  | Introduction |
|  | 1-Tier Applications |
|  | 2-Tier Applications |
|  | 3-Tier Applications |
|  | n-Tier Applications |
|  | Putting Testing Complex Applications in Perspective |
|  | Summary |
|  | **Future Directions in Testing** |
|  | Introduction |
|  | Future Directions in Software Development That Could Increase the Need for Testing Professionals |
|  | Software Testing Challenges Already Upon Us |
|  | Software Testing Near Future Challenges |
|  | Software Testing Challenges to Come |
|  | Putting Future Testing Directions in Perspective |
|  | Summary |

# **Software Quality Assurance**

* Software Quality Assurance: From Theory to Implementation, Daniel Galin

|  |  |
| --- | --- |
|  | **Software Quality Assurnace** |
|  | **Part-01: Introduction** |
|  | **The Software Quality Challenge** |
| 01 | The Uniqueness of Software Quality Assurance |
|  | The Environments for Which SQA Methods and Developed |
|  | Summary |
|  | Review Questions |
|  | Topics for Discussion |
|  | **What is Software Quality?** |
|  | What is Software? |
|  | Software Errors Faults and Failures |
|  | Classification of the Causes of Software Errors |
|  | Software Quality – Definition |
|  | Software Quality Assurance – Definition and Objectives |
|  | Software Quality Assurance and Software Engineering |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | **Software Quality Factors** |
|  | The Need for Comprehensive Software Quality Requirements |
|  | Classifications of Software Requirements into Software Quality Factors |
|  | Product Operation Software Quality Factors |
|  | Product Revision Software Quality Factors |
|  | Product Transition Software Quality Factors |
|  | Alternative Models of Software Quality Factors |
|  | Who is Interested in the Definition of Quality Requirements? |
|  | Software Compliance with Quality Factors |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | **The Components of the Software Quality Assurance System – Overview** |
|  | The SQA System – An SQA Architecture |
|  | Pre-project Components |
|  | Software Project Life Cycle Components |
|  | Infrastructure Components for Error Prevention and Improvement |
|  | Management SQA Components |
|  | SQA Standards, System Certification, and Assessment Components |
|  | Organizing for SQA – The Human Components |
|  | Considerations Guiding Construction of an Organization’s SQA System |
|  | **Part-02: Pre-project Software Quality Components** |
|  | **Contract Review** |
|  | Introduction: The CFV Project Completion Celebration |
|  | The Contract Reviw Process and Its Stages |
|  | Contract Reviw Objectives |
|  | Implementation of a Contract Review |
|  | Contract Review Subjects |
|  | Contract Reviews for Internal Projects |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | Appendix 5A: Proposal Draft Reviews – Subjects Checklist |
|  | Appendix 5B: Contract Draft Review – Subjects Checklist |
|  | Development and Quality Plans |
|  | Development Plan and Quality Plan Objectives |
|  | Elements of the Development Plan |
|  | Elements of the Quality Plan |
|  | Development and Quality Plans for Small Projects and for Internal Projects |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | Appendix 6A: Software Development Risks and Software Risk Management |
|  | **SQA Components in the Project Life Cycle** |
|  | **Integrating Quality Activities in the Project Life Cycle** |
|  | Classic and Other Software Development Methodologies |
|  | Factors Affecting Intensity of Quality Assurance Activities in the Development Process |
|  | Verification, Validation and Qualification |
|  | A Model for SQA Defect Removal Effectiveness and Cost |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | **Reviews** |
|  | Review Objectives |
|  | Formal Design Reviews (DRs) |
|  | Peer Reviews |
|  | A Comparison of the Team Review Methods |
|  | Expert Opinions |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | Appendix 8A: DR Report Form |
|  | Appendix 8B: Inspection Session Findings Report From |
|  | Appendix 8C: Inspection Session Summary Report |
|  | **Software Testing – Strategies** |
|  | Definition and Objectives |
|  | Software Testing Strategies |
|  | Software Test Classifications |
|  | White Box Testing |
|  | Black Box Testing |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | Software Testing – Implementation |
|  | The Testing Process |
|  | Test Case Design |
|  | Automated Testing |
|  | Alpha and Beta Site Testing Programs |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | Assuring the Quality of Software Maintenance Components |
|  | Introduction |
|  | The Foundations of High Quality |
|  | Pre-Maintenance Software Quality Components |
|  | Maintenance Software Quality Assurance Tools |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | **Assuring the Quality of External Participants’ Contributions** |
|  | Introduction: The HealthSoft Case |
|  | Types of External Participants |
|  | Risks and Benefits of Introducing External Participants |
|  | Assuring Quality of External Participants Contributions: Objectives |
|  | SQA Tools for Assuring the Quality of External Participants; Contributions |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | **CASE Tools and Their Effect on Software Quality** |
|  | What is a CASE tool? |
|  | The Contribution of CASE Tools to Software Production Quality |
|  | The Contribution of CASE Tools to Software Maintenance Quality |
|  | The Contribution of CASE Tools to Improved Project Management |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | **Part-04: Software Quality Infrastructure** |
|  | **Procedures and Work Instructions** |
|  | The Need for Procedures and Work Instructions |
|  | Procedures and Procedures Manuals |
|  | Work Instructions and Work Instruction Manuals |
|  | Procedures and Work Instructions: Preparation, Implementation and Updating |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | Appendix 14A: Design Review Procedure |
|  | **Supporting Quality Devices** |
|  | Templates |
|  | Checklists |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | **Staff Training and Certification** |
|  | Introduction: Surprises for the “3S” Development Team |
|  | The Objectives of Training and Certification |
|  | The Training and Certification Process |
|  | Determining Professional Knowledge Requirements |
|  | Determining Training and Updating Needs |
|  | Planning Training and Updating Programs |
|  | Defining Positions Requiring Certification |
|  | Planning The Certification Processes |
|  | Delivery of Training and Certification Programs |
|  | Follow-up Subsequent to Training and Certification |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | **Corrective and Preventive Actions** |
|  | Introduction: The “3S” Development Team Revisited |
|  | Corrective and Preventive Actions – Definitions |
|  | The Corrective and Preventive Actions Process |
|  | Information Collection |
|  | Analysis of Collected Information |
|  | Development of Solutions and Their Implementation |
|  | Follow-up of Activities |
|  | Organizing for Preventive and Corrective Actions |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | **Configuration Management** |
|  | Software Configuration, Its Items and its Management |
|  | Software Configuration Management – Tasks and Organization |
|  | Software Change Control |
|  | Release of Software Configuration Versions |
|  | Provision of SCM Information Services |
|  | Software Configuration Management Audits |
|  | Computerized Tools for Managing Software Configuration |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | **Documentation Control** |
|  | Introduction: Where is the Documentation? |
|  | Controlled Documents and Quality Records |
|  | The Controlled Documents List |
|  | Controlled Document Preparation |
|  | Issues of Controlled Document Approval |
|  | Issues of Controlled Document Storage and Retrieval |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | **Part-05: Management Components of Software Quality** |
|  | **Project Progress Control** |
|  | The Components of Project Progress Control |
|  | Progress Control of Internal Projects and External Participants |
|  | Implementation of Project Progress Control Regimes |
|  | Computerized Tools for Software Progress Control |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | **Software Quality Metrics** |
|  | Objectives of Quality Measurement |
|  | Classification of Software Quality Metrics |
|  | Process Metrics |
|  | Product Metrics |
|  | Implementation of Software Quality Metrics |
|  | Limitations of Software Metrics |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | Appendix 21A: The Function Point Method |
|  | **Costs of Software Quality** |
|  | Objectives of Cost of Software Quality Metrics |
|  | The Classic Model of Cost of Software Quality |
|  | An Extended Model for Cost of Software Quality |
|  | Application of a Cost of Software Quality System |
|  | Problems in the Application of Cost of Software Quality Metrics |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | **Part-06: Standards, Certification and Assessment** |
|  | **Quality Management Standards** |
|  | The Scope of Quality Management Standards |
|  | ISO 9001 and ISO 9000-3 |
|  | Certification According to ISO 9000-3 |
|  | Capability Maturity Models – CMM and CMMI Assessment Methodology |
|  | The Bootstrap Methodology |
|  | The SPICE Project and the ISO/IEC 15504 Software Process Assessment Standard |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | Appendix 23A: CMMI Process Areas |
|  | Appendix 23B: ISO/IEC 15504 Model Processes |
|  | **SQA Project Process Standards – IEEE Software Engineering Standards** |
|  | Structure and Content of IEEE Software Engineering Standards |
|  | IEEE/EIA Std 12207 – Software Life Cycle Processes |
|  | IEEE Std 1012 – Verification and Validation |
|  | IEEE Std 1028 – Reviews |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | Appendix 24A: IEEE Software Engineering Standards |
|  | Appendix 24B: MIL-STD-498: List of Data Item Descriptions (DIDs) |
|  | Appendix 24C: Task Structure for a Primary Process According to IEEE/EIA Std 12207 – Example |
|  | Part-07: Organizing for Quality Assurance |
|  | Management and Its Role in Software Quality Assurance |
|  | Top Management’s Quality Assurance Activities |
|  | Department Management Responsibilities for Quality Assurance |
|  | Project Management Responsibilities for Quality Assurance |
|  | Summary |
|  | Selected Bibliography |
|  | Review Questions |
|  | Topics for Discussion |
|  | **The SQA Unit and Other Actors in the SQA System** |
|  | The SQA Unit |
|  | SQA Trustees and THEIR Tasks |
|  | SQA Committees and Their Tasks |
|  | SQA Forums – Tasks and Methods for Operation |
|  | Summary |
|  | Review Questions |
|  | Topics for Discussion |

# **Software Project Management**

* Software Project Management: A Process-Driven Approach, Ashfaque Ahmed
* Essential Scrum: A Practical Guide to the Most Popular Agile Process, Kenneth S. Rubin

|  |  |
| --- | --- |
|  | **Software Project Management** |
|  | **Part-01: Project Management Fundamentals** |
|  | **Introduction to Software Project Management** |
| 01 | Introduction |
|  | What is Project Management? |
|  | What is Software Project Management? |
|  | Importance of Software Projects |
|  | Problems in Project Management |
|  | Processes in Software Projects |
|  | Project Processes, People, and Technology |
|  | Successful Software Project Manger |
|  | Project Management Processes |
|  | Software Project Initiation – Topics 4 |
|  | Software Project Planning | Components of Project Planning |
|  | Software Project Monitoring and Control |
|  | Software Project Closure |
|  | Configuration and Version Control Management |
|  | Management Metrics |
|  | Case Study – Topics 3 |
|  | Chapter Summary |
|  | Exercises |
|  | Review Questions |
|  | Recommended Readings |
|  | **Project Initiation Management** |
|  | Introduction |
|  | Define Project Charter |
|  | Define Project Scope |
|  | Define Project Objectives |
|  | Practical Considerations |
|  | Estimate Initial Project Size |
|  | Estimate Initial Project Effort and Costs |
|  | Estimate Initial Project Scheduel |
|  | Create Initial Project Plan |
|  | Project Initiation in Iterative Model |
|  | Stakeholder Influence |
|  | Quality Planning |
|  | Feasibility Study |
|  | Project Division |
|  | Artifacts of Project Initiation |
|  | Case Study – Topics 3 |
|  | Chapter Summary |
|  | Exercise |
|  | Review Questions |
|  | Recommended Readings |
|  | **Software Project Effort and Cost Estimation** |
|  | Introduction |
|  | Effort Estimation Techniques |
|  | Choosing a Suitable Effort Estimate Technique |
|  | Function Point Analysis | Function Point Analysis Usage |
|  | Wide Band Delphi |
|  | COCOMO – Topics 4 |
|  | Effort Estimation for Waterfall Model-Based Planning |
|  | Effort Estimation for Iterations Model-Based Planning |
|  | Cost Estimation |
|  | Cost Factor Analysis |
|  | Activity-Based Cost Estimation |
|  | Cost Estimation for Iterations-Based Planning |
|  | Schedule Estimation |
|  | Schedule Estimation for Waterfall Model-Based planning |
|  | Resource Estimation |
|  | Artifacts of Effort and Cost Estimates |
|  | Practical Considerations in Effort and Cost Estimates |
|  | Effort and Cost in Product Development |
|  | Case Study – Topics 3 |
|  | Exercise |
|  | Review Questions |
|  | Recommended Readings |
|  | **Risk Management** |
|  | Introduction |
|  | Causes of Risks – Topics 5 |
|  | Causes of Risks – Topics 5 |
|  | Risk Categories – Topics 5 |
|  | Risk Analysis |
|  | Balancing Act |
|  | Project Risk Management in Agile Models |
|  | Artifacts of Project Risk Management |
|  | Case Study | Risks on This Project |
|  | Chapter Summary |
|  | Exercises |
|  | Review Questions |
|  | Recommended Readings |
|  | **Configuration Management** |
|  | Introduction |
|  | Configuration Management |
|  | Configuration Management Techniques |
|  | Artifacts of Configuration Management |
|  | Configuration Management Case Study |
|  | Configuration Management for an Incremental Iteration Development Environment |
|  | Chapter Summary |
|  | Exercises |
|  | Review Questions |
|  | Recommended Readings |
|  | **Project Planning** |
|  | Introduction |
|  | Project Planning Fundamentals – Topics 5 |
|  | Project Planning Fundamentals – Topics 5 |
|  | Project Planning Fundamentals – Topics 4 |
|  | Project Planning Techniques – Topics 2 |
|  | Project Planning Artifacts |
|  | Project Planning in Agile Models | Iteration Planning |
|  | Planning at Project Management Office |
|  | Case Study – Topics 2 |
|  | Chapter Summary |
|  | Exercises |
|  | Review Questions |
|  | Recommended Readings |
|  | **Project Monitoring and Control** |
|  | Introduction |
|  | Project Monitoring – Topics 5 |
|  | Project Monitoring – Topics 5 |
|  | Project Monitoring – Topics 3 |
|  | Project Control Techniques – Topics 5 |
|  | Project Monitoring and Control Artifacts |
|  | Project Monitoring and Control in Iterative Model – Topics 2 |
|  | Case Study – Topics 2 |
|  | Chapter Summary |
|  | Exercises |
|  | Review Questions |
|  | Recommended Readings |
|  | **Project Closure** |
|  | Introduction |
|  | Source Code Management |
|  | Project Data Management |
|  | Project Closure in Iterative Model |
|  | Lessons Learned |
|  | Resource Release |
|  | Data Structures |
|  | Case Study |
|  | Chapter Summary |
|  | Exercises |
|  | Review Questions |
|  | Recommended Readings |
|  | **Part-02: Software Life-Cycle Management** |
|  | **Introduction to Software Life-Cycle Management** |
|  | Introduction |
|  | Software Engineering Management |
|  | Software Life-Cycle Management Processes |
|  | Software Life-Cycle in Waterfall Model |
|  | Software Life-Cycle in Iterative Model |
|  | Moving From Waterfall Model |
|  | Software Life-Cycle in Concurrent Engineering Model |
|  | Software Life-Cycle Processes – Topics 6 |
|  | Software Life-Cycle Metrics |
|  | Work Products |
|  | Quality Assurance |
|  | Case Study |
|  | Chapter Summary |
|  | Exercises |
|  | Review Questions |
|  | Recommended Readings |
|  | **Software Requirement Management** |
|  | Introduction |
|  | Software Requirements Development – Topics 2 |
|  | Software Requirements Management – Topics 2 |
|  | Requirement Life-Cycle Management – Topics 2 |
|  | Software Requirements Practical Strategy |
|  | Software Requirements Artifacts |
|  | Software Requirements Quality Control |
|  | Case Study – Topics 3 |
|  | Chapter Summary |
|  | Review Questions |
|  | Recommended Readings |
|  | **Software Design Management** |
|  | Introduction |
|  | Software Design Fundamentals – Topics 3 |
|  | Software Design Methods – Topics 2 |
|  | Design Version Control | Subversions |
|  | Design Characteristics |
|  | Software Design Techniques – Topics 6 |
|  | Software Design for Internet |
|  | Software Design Quality |
|  | Concurrent Engineering in Software Design |
|  | Design Life-Cycle Management |
|  | Module Division (Refactoring) |
|  | Module Coupling |
|  | Case Study – Topics 2 |
|  | Chapter Summary |
|  | Review Questions |
|  | Recommended Readings |
|  | **Software Construction** |
|  | Introduction |
|  | Coding Standards – Topics 6 |
|  | Coding Framework |
|  | Reviews (Quality Control) – Topics 4 |
|  | Coding Methods – Topics 6 |
|  | Configuration Management |
|  | Unit Testing |
|  | Integration Testing |
|  | Software Construction Artifacts |
|  | Software Construction in Iterative Model |
|  | Case Study | Continuous Integration |
|  | Chapter Summary |
|  | Review Questions |
|  | Recommended Readings |
|  | **Software Testing** |
|  | Introduction |
|  | Problems with Traditional Development Model |
|  | Verification and Validation |
|  | Test Strategy and Planning – Topics 4 |
|  | Test Automation – Topics 2 |
|  | Test Project Monitoring and Control – Topics 6 |
|  | Test Reporting |
|  | Test Artifacts | Management Artifacts |
|  | Practical Considerations |
|  | Software Testing in Iterative Model |
|  | Case Study |
|  | Chapter Summary |
|  | Review Questions |
|  | Recommended Reading |
|  | **Production Release and Maintenance** |
|  | Introduction |
|  | Product Release Management |
|  | Product Implementation |
|  | User Training |
|  | Maintenance Introduction |
|  | Maintenance Types – Topics 4 |
|  | Maintenance Cost |
|  | Maintenance Process |
|  | Maintenance Life Cycle |
|  | Maintenance Techniques – Topics 3 |
|  | Case Study – Topics 2 |
|  | Chapter Summary |
|  | Review Questions |
|  | Recommended Readings |
|  | **Part-03: Software Engineering Management** |
|  | **Process Standards Introduction** |
|  | Introduction |
|  | Root Cause of Problems in Software Projects |
|  | Solutions for Problems in Software Projects |
|  | Standard Process for Software Projects | Process Tailoring |
|  | Standard Process Across Software Projects |
|  | Program Management |
|  | Portfolio Management |
|  | Statistical Process Control on Software Projects |
|  | Cost of Nonstandard Processes |
|  | Organization Training |
|  | Software Project Abandonment |
|  | Defect Prevention |
|  | Software Project without Process |
|  | Process Improvement |
|  | Final Word |
|  | Review Questions |
|  | Recommended Readings |
|  | **Software Process Standards and Process Improvement** |
|  | Introduction |
|  | CMMI Standards | CMMI Standards in a Nutshell |
|  | ISO Standards | ISO Standards in a Nutshell |
|  | IEEE Standards | IEEE Standards in a Nutshell |
|  | Rational Unified Process | RUP in a Nutshell |
|  | Agile Methodologies | Extreme Programming in a Nutshell |
|  | Test Process Improvement Techniques |
|  | Deming’s PDCA Technique |
|  | Test Maturity Model – Topics 6 |
|  | Test Process Improvement |
|  | Critical Testing Process |
|  | Systematic Test and Evaluation Process |
|  | Process Improvement Life-Cycle |
|  | Process Standard Certifications |
|  | Benefits of Certification |
|  | How to Apply for a Certification – Topics 2 |
|  | Future of Certifications |
|  | Review Questions |
|  | Recommended Readings |
|  | **Process Selection** |
|  | Introduction |
|  | History of Plan-Driven Model |
|  | Strengths of Plan-Driven Model |
|  | Limitations of Plan-Driven Model |
|  | History of Agile Methods |
|  | Strengths of Agile Methods |
|  | Limitations of Agile Methods |
|  | Once and for All |
|  | Best Practice for Process Selection |
|  | Converting Traditional to Agile Model |
|  | Case Study |
|  | Exercise |
|  | Review Questions |
|  | Recommended Readings |
|  | **Part-04: People Management** |
|  | **Introduction to People Management** |
|  | Introduction |
|  | People Management |
|  | Team Management |
|  | Supplier Management |
|  | Customer Management |
|  | Communication Management |
|  | Review Questions |
|  | **Team Management** |
|  | Introduction |
|  | Organization Structure and Policies – Topics 4 |
|  | Motivating the Team |
|  | Team Effectiveness – Topics 3 |
|  | Training |
|  | Nurturing |
|  | Conflict Management |
|  | Knowledge Management |
|  | Communication Management |
|  | Case Study |
|  | Review Questions |
|  | Recommended Readings |
|  | **Customer Management** |
|  | Introduction |
|  | Customer Expectation Management |
|  | Negotiation Management |
|  | Rapport Building Management |
|  | Reporting Management |
|  | Return on Investment |
|  | Bottom Line |
|  | Case Study |
|  | Review Questions |
|  | Recommended Readings |
|  | **Supplier Management** |
|  | Introduction |
|  | Supplier Search Management – Topics 3 |
|  | Suppler Agreement Management – Topics 2 |
|  | Suppler Communication management |
|  | Organization Structure |
|  | Account Management |
|  | Project Offshore Transition |
|  | Case Study |
|  | Review Questions |
|  | Recommended Readings |
|  | **Part-05: Tools and Techniques** |
|  | **Software Project Management Tools Introduction** |
|  | Introduction |
|  | Compatibility with Environment |
|  | Cost of Tool |
|  | Data Integration Among Tools |
|  | Existing Skills on Tools |
|  | Tool Obsolescence |
|  | Scale of Operation |
|  | Review Questions |
|  | **Project Management and Software Life-Cycle Tools** |
|  | Introduction |
|  | Requirement Management Tools |
|  | Software Design Management Tools – Topics 2 |
|  | Software Build Management Tools – Topics 3 |
|  | Software Testing Management Tools – Topics 3 |
|  | Project Management Tools |
|  | Project Planning Tools – Topics 2 |
|  | Review Questions |
|  | Recommended Readings |
|  | **Software Project Templates** |
|  | Introduction |
|  | Software Life-Cycle Template Guidelines – Topics 4 |
|  | Project Management Template Guidelines – Topics 3 |
|  | Recommended Readings |
|  | **Future Tools and Techniques** |
|  | Introduction |
|  | Software Industry Trends – Topics 5 |
|  | Software Industry Trends – Topics 4 |
|  | Software Requirement Management Tools |
|  | Software Design Management Tools |
|  | Software Build Management Tools – Topics 3 |
|  | Software Testing Management Tools – Topics 5 |
|  | Software Project Management Tools |
|  | Recommended Readings |
|  | **Essential Scrum** |
|  | **Introduction** |
| 01 | What is Scrum? |
|  | Scrum Origins |
|  | Why Scrum? |
|  | Genomica Results |
|  | Can Scrum Help You? – Topics 6 |
|  | Closing |
|  | **Part-01: Core Concepts** |
|  | **Scrum Framework** |
|  | Overview |
|  | Scrum Roles – Topics 3 |
|  | Scrum Activities and Artifacts – Topics 4 |
|  | Scrum Activities and Artifacts – Topics 4 |
|  | Closing |
|  | **Agile Principles** |
|  | Overview |
|  | Variability and Uncertainty – Topics 4 |
|  | Prediction and Adaptation – Topics 5 |
|  | Validate Learning – Topics 3 |
|  | Work in Process (WIP) – Topics 4 |
|  | Progress – Topics 3 |
|  | Performance – Topics 3 |
|  | Closing |
|  | **Sprints** |
|  | Overview |
|  | Timeboxed – Topics 6 |
|  | Short Duration – Topics 6 |
|  | Consistent Duration – Topics 2 |
|  | No Goal-Altering Changes – Topics 6 |
|  | Definition of Done – Topics 4 |
|  | Closing |
|  | **Requirements and User Stories** |
|  | Overview |
|  | Using Conversations |
|  | Progressive Refinement |
|  | What are User Stories? – Topics 3 |
|  | Level of Detail |
|  | INVEST in Good Stories – Topics 6 |
|  | Nonfunctional Requirements |
|  | Knowledge-Acquisition Stories |
|  | Gathering Stories – Topics 2 |
|  | Closing |
|  | **Production Backlog** |
|  | Overview |
|  | Product Backlog Items |
|  | Good Product Backlog Characteristics – Topics 4 |
|  | Grooming – Topics 3 |
|  | Definition of Ready |
|  | Flow Management – Topics 2 |
|  | Which and How Many Product Backlogs? – 4 |
|  | Closing |
|  | **Estimation and Velocity** |
|  | Overview |
|  | What and When We Estimate – Topics 3 |
|  | PBI Estimation Concepts – Topics 4 |
|  | PBI Estimation Units – Topics 2 |
|  | Planning Poker – Topics 3 |
|  | What is Velocity? |
|  | Calculate a Velocity Range |
|  | Forecasting Velocity |
|  | Affecting Velocity |
|  | Misusing Velocity |
|  | Closing |
|  | **Technical Debt** |
|  | Overview |
|  | Consequences of Technical Debt – Topics 5 |
|  | Consequences of Technical Debt – Topics 4 |
|  | Causes of Technical Debt – Topics 4 |
|  | Technical Debt Must Be Managed |
|  | Managing the Accrual of Technical Debt – Topics 3 |
|  | Making Technical Debt Visible – Topics 2 |
|  | Servicing the Technical Debt – Topics 5 |
|  | Closing |
|  | **Part-02: Roles** |
|  | **Product Owner** |
|  | Overview |
|  | Principal Responsibilities – 6 |
|  | Characteristics/Skills – Topics 4 |
|  | A Day in the Life |
|  | Who Should Be a Product Owner? – Topics 4 |
|  | Product Owner Combined with Other Roles |
|  | Product Owner Team – Topics 2 |
|  | Closing |
|  | **ScrumMaster** |
|  | Overview |
|  | Principal Responsibilities – Topics 6 |
|  | Characteristics/Skills – Topics 6 |
|  | A Day in the Life |
|  | Fulfilling the Role – Topics 3 |
|  | Closing |
|  | **Development Team** |
|  | Overview |
|  | Role-Specific Teams |
|  | Principal Responsibilities – Topics 5 |
|  | Characteristics/Skills – Topics 5 |
|  | Characteristics/Skills – Topics 5 |
|  | Closing |
|  | **Scrum Team Structures** |
|  | Overview |
|  | Feature Teams Versus Component Teams |
|  | Multiple-Team Coordination – Topics 2 |
|  | Closing |
|  | **Managers** |
|  | Overview |
|  | Fashioning Teams – Topics 5 |
|  | Nurturing Teams – Topics 4 |
|  | Aligning and Adapting the Environment – Topics 4 |
|  | Managing Value – Creation Flow – Topics 3 |
|  | Project Managers – Topics 2 |
|  | Closing |
|  | **Part-03: Planning** |
|  | **Scrum Planning Principles** |
|  | Overview |
|  | Don’t Assume We Can Get the Plans Right Up Front |
|  | Up-Front Planning Should Be Helpful without Being Excessive |
|  | Keep Planning Options Open Until the Last Responsible Moment |
|  | Focus More on Adapting and Re-planning Than on Conforming to a Plan |
|  | Correctly Manage the Planning Inventory |
|  | Favor Smaller and More Frequent Releases |
|  | Plan to Learn Fast and Pivot When Necessary |
|  | Closing |
|  | **Multilevel Planning** |
|  | Overview |
|  | Portfolio Planning |
|  | Product Planning (Envisioning) – Topics 3 |
|  | Release Planning |
|  | Sprint Planning |
|  | Daily Planning |
|  | Closing |
|  | **Portfolio Planning** |
|  | Overview – Topics 3 |
|  | Scheduling Strategies – Topics 3 |
|  | Inflow Strategies – Topics 4 |
|  | Outflow Strategies – Topics 3 |
|  | In-Process Strategies | Use Marginal Economics |
|  | Closing |
|  | **Envisioning (Product Planning)** |
|  | Overview – Topics 3 |
|  | SR4U Example |
|  | Visioning |
|  | High-Level Product Backlog Creation |
|  | Product Roadmap Definition |
|  | Other Activities |
|  | Economically Sensible Envisioning – Topics 6 |
|  | Closing |
|  | **Release Planning (Longer-Term Planning)** |
|  | Overview – Topics 3 |
|  | Release Constraints – Topics 6 |
|  | Grooming the Product Backlog |
|  | Refine Minimum Releasable Features (MRFs) |
|  | Sprint Mapping (PBI Slotting) |
|  | Fixed-Date Release Planning |
|  | Fixed-Scope Release Planning |
|  | Calculating Cost |
|  | Communicating – Topics 2 |
|  | Closing |
|  | **Part-04: Sprinting** |
|  | Overview – Topics 3 |
|  | Approaches to Sprint Planning – Topics 2 |
|  | Determining Capacity – Topics 3 |
|  | Selecting Product Backlog Items |
|  | Acquiring Confidence |
|  | Refine the Sprint Goal |
|  | Finalize the Commitment |
|  | Closing |
|  | **Sprint Execution** |
|  | Overview – Topics 3 |
|  | Sprint Execution Planning |
|  | Flow Management – Topics 5 |
|  | Daily Scrum |
|  | Task Performance – Technical Practices |
|  | Communicating – Topics 3 |
|  | Closing |
|  | **Sprint Review** |
|  | Overview |
|  | Participants |
|  | Prework – Topics 5 |
|  | Approach – Topics 4 |
|  | Sprint Review Issues – Topics 3 |
|  | Closing |
|  | **Sprint Retrospective** |
|  | Overview |
|  | Participants |
|  | Prework – Topics 4 |
|  | Approach – Topics 5 |
|  | Follow Through |
|  | Sprint Retrospective Issues |
|  | Closing |
|  | **The Path Forward** |
|  | There is No End State |
|  | Discover Your Own Path |
|  | Sharing Best Practices |
|  | Using Scrum to Discover the Path Forward |
|  | Get Going |