QUALITY ASSURANCE PLAN:

Project Quality Plan and Software Quality Assurance Plan

The goal of the quality assurance plan assignment is to provide students with a practical opportunity to plan a comprehensive quality assurance program for their software or project.

Students may work on this project in **groups** (students number to be determined later). Group projects will be given a single grade; presentation grade vary for individual students. You are free to choose your own groups. Expectations for the level of depth in the plan will be scaled to the quality of work; as a rule of thumb, your QA plan should be at least 20 – 30 pages (12-point single spaced) formatting (excluding process workflow and chartings).

NOTE: There are various sharing of URLs. These sharing are to aid of students' understanding in the "**IT project quality plan"** and **"IT software quality plan"** area. Students are STRONGLY recommended to explore more videos, website, articles pertaining to relevant area of assignment purposes.

Project Quality Plan

Quality can be defined as meeting the customer's expectations or exceeding the customer expectations achieved by way of deliverables and/or activities performed to produce those deliverables.

Project Quality Plan can be defined as a set of activities planned at the beginning of the project that helps achieve Quality in the Project being executed. The Purpose of the Project Quality Plan is to define these activities / tasks that intends to deliver products while focusing on achieving customer's quality expectations. These activities / tasks are defined on the basis of the quality standards set by the organization delivering the product.

Project Quality Plan identifies which Quality Standards are relevant to the project and determines how can they be satisfied. It includes the implementation of Quality Events (peer reviews, checklist execution) by using various Quality Materials (templates, standards, checklists) available within the organization. The holding of the Quality Event is termed as Quality Control. As an output of the various activities, Quality Metrics or Measurements are captured which assist in continuous improvement of Quality thus adding to the inventory of Lessons Learned. Quality Assurance deals in preparation of the Quality Plan and formation of organization wide standards.

Software Quality Assurance Plan

The purpose of this **Software Quality Assurance Plan** (SQAP) is to **define** the techniques, procedures, and methodologies that will be used at the organisation to assure timely delivery of the **software** that meets specified requirements within project resources.

Software Quality Assurance Plan (SQAP) consists of those procedures, techniques and tools used to ensure that a product (Hardware, Software, Services and Processes) meets the requirements specified in the **software** requirements specification.

Project Quality Plan versus Software Quality Assurance Plan

Project Quality Plan (PQP)

- It is a project level quality plan
- Project commitment to follow applicable set of standards, regulations, procedures and tools during SDLC
- Contains quality goals to be achieved
- SQP may contain new procedures for the project which are not defined in organisation SQA guide
- SQP may contain new tools being used in the project for SQA

Software Quality Assurance (SQA) Plan:

SQA Plan is an organisational quality guide:

- Process that ensures that developed software meets and complies with defined or standard quality specifications.
- Common Standards, regulations, and procedures to confirm work products during SDLC
- SQA is an ongoing process within the software development lifecycle (SDLC) that routinely checks the developed software to ensure it meets desired quality measures.
- SQA helps ensure the development of high-quality software.
- Organisational knowledge base of best practices
- Off-the-shelf software tools can be used
- Preventive activities

The Relationship of SQA, Quality Control and Testing

Software Quality Control (SQC):
- Set of activities for ensuring quality in software products
- Corrective activities
- Quality Control (QC) can be considered as a subset of Quality Assurance (QA)

Examples:

Reviews
1) Requirement Review
2) Design Review
3) Code Review
4) Deployment Plan Review
5) Test Plan Review
6) Test Cases Review

Testing
1) Unit Testing
2) Integration Testing
3) System Testing
4) Acceptance Testing

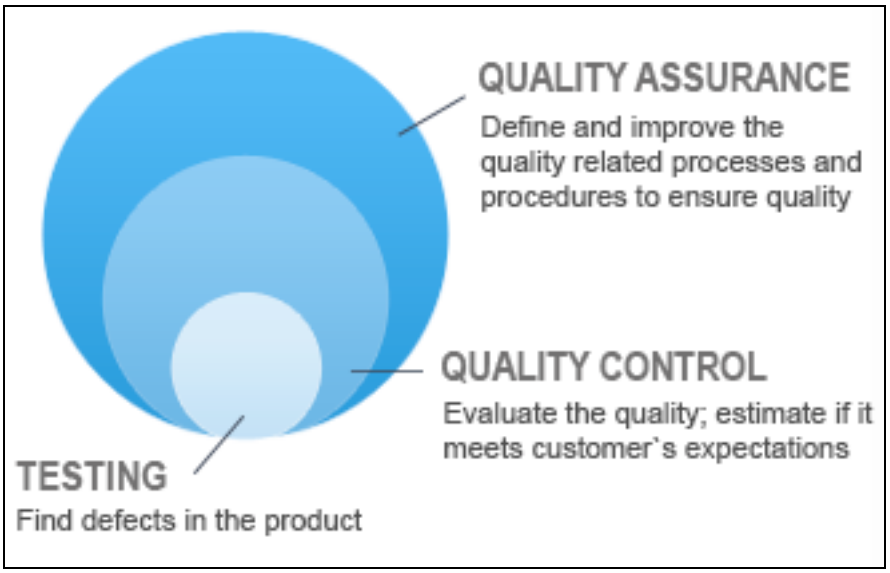


Fig. The relationship between SQA, QC and Testing

Software Quality Assurance Best Practice

Here are some best practices for an effective SQA implementation

- **Continuous improvement:** All the standard process in SQA must be improved **frequently** and made **official** so that the other can follow. This process should be **certified** by popular organization such as ISO, CMMI… etc.
- **Documentation:** All the QA policies and methods, which are defined by QA team, should be documented for training and reuse for future projects.
- **Experience:** Choosing the members who are seasoned SQA auditors is a good way to ensure the quality of management review
- **Tool Usage:** Utilizing tool such as the tracking tool, management tool for SQA process reduces SQA effort and project cost.
- **Metrics:** Developing and creating metrics to track the software quality in its current state, as well as to compare the improvement with previous versions, will help increase the value and maturity of the Testing process
- **Responsibility:** The SQA process is not the SQA member's task, but **everyone**'s task. Everybody in the team is responsible for quality of product, not just the test lead or manager.

NOTE: These are IMPORTANT practices when developing a SQAP.

Example: Change Control Management

Change Control is an important part of the project management process. With the pace of change today, it is almost certain that projects will face the demand for change during their life. While change may help ensure the project's alignment with business needs, it is important to consider and approve each change carefully.

The change control process in project management ensures that each change proposed during a project is **adequately defined, reviewed and approved before implementation**. The change control process helps avoid unnecessary changes that might disrupt services and also ensures the efficient use of resources.

Change Control normally contains five stages:
a) Proposing a Change
b) Summary of Impact
c) Decision
d) Implementing a Change
e) Closing a Change

(Haughey, D, 2011. What is Change Control, [online] Available at: https://www.projectsmart.co.uk/what-is-change-control.php, [Access: 13 Jan 2018].

A. Proposing a Change

This process gives the ability for anyone in the project team (including the customer) to suggest a change to the project. The proposal must include a **description of the change** and expected benefits or other reason for the change.

The change process will kick-start from client's Business Requirement List, thereafter handling by the project team to propose change(s) to system. The change control management involve internal processes and sub-processes within the company from proposing change(s), making the change(s), testing the change(s) and delivering the change(s) as system/patch release; all the way to system/patch implementation at client site.

The change is presented using various forms such as Change Form, which will be added to the Change Log for the project. Others forms like Test Form, Test Script, Software Release Note, Source Code Check-in/Out Log, Functional/Technical Specification etc.

B. Summary of Impact

The project manager, who will consider the overall effect on the project, covering the following items, carries out this process:
1) Quantifiable cost savings and benefits
2) Legal, regulatory or other unquantifiable reason for change
3) Estimated cost of the change
4) Impact on timescales
5) Extra resources needed
6) Impact on other projects and business activities
7) New risks and issues

After this assessment, the project manager recommends whether to carry out the change.

C. Decision

This process involves a review of the change request by an approved authority who will consider all the information provided by the project manager and person making the request. The decision will usually be:
- Accept
- Accept with comments and special conditions
- Reject
- Defer (change is not approved, but is left for consideration later)

D. Implementing a Change

If the change is approved it is planned, scheduled and executed at a time agreed with the stakeholders. As part of the planning, a regression test plan is needed in case the change needs to be backed out. After implementation, it is usual to carry out a post-implementation review.

E. Closing a Change

Once implemented, the requester checks and agrees on the change, and it is closed in the Change Log by the project manager.

According to Haughey, D, there are two documents used during the process:
1) **Change Log**: used to provide a record of all changes requested and decisions made
2) **Change Form**: used to document details of the change, including the business case (i.e. Software Change Request)

Following are some **sharing of process flow** (i.e. details and important fields for each process).

No	Description
1	**Project Document** • Whenever kick-start a new project, it is necessary to raise a "Project Document". Project Document encompasses the followings: • Project Code • Project Description • Project Version • Project Team Members • Project Aims • Project Clients • Project Scope, etc.

2	**Functional/Technical Specification**
	• A brief functional specification is required when start-up a new project.
	• Functional/Technical Specification requires updates when there is:
	  • New files and/or Drop of existing files
	  • New classes and/or Drop/Replacement of classes
	  • New store-procedure and/or Drop of store-procedures
	  • New global/local variables and/or Drop of global/local variables, etc.

3	**Change Request Form**
	• All changes make to a project MUST have an approve "Change Request Form".
	• All "Change Request Form" numbers are unique and must be recorded
	• Change Request Form is the link between "Business Requirement List" and to all project documentations for a project
	• Items to be included in the Change Request Forms are:
	  ○ Change Request No
	  ○ Change Type (Fault, Enhancement, Request)
	  ○ Change Request Level (Low, Medium and High)
	  ○ Impact Level (Low, Medium and High)
	  ○ Date
	  ○ Change Description/Analysis
	  ○ Files Affected
	  ○ Duration of Change
	  ○ New/Drop of Files, Variables (Global/Local)
	  ○ Analysis By
	  ○ Change Perform By
	  ○ Testing Required (Outline)
	  ○ Coding Effort

No	Description
	○ Testing Effort ○ Approve By, etc.
4	**Configuration Management** • Source-code check-in should be **programmer independent**. • List of source-code files to be checked-in must be mapped with "Change Form" • The check-in file must be the working file in server, which has been merged by programmers (if more than one change request for single source file) or being tested by all testers.
5	**Testing (Unit Testing)** • A formal "Test Script" is required for EACH "Change Form" • Failed test cases/scenarios must be re-tested with latest source-file until it pass • All test form must be mapped to change form • One CF with one Test Script. One Test Script contains multiple rows of record. Each record may represent a test case, test scenario or test condition or vice versa. • All testing by team members MUST be reviewed by a team project whom has higher seniority than tester • All test cases, test scenarios, test conditions etc. MUST have physical proof; i.e. screen capture and paste into MS-Word • However, for UI testing, evidence of screen shots are mandatory • All Change Form MUST have at least one pass test form (softcopy or hardcopy)

6	**Software Release Note (SRN)**
	• All Change Forms MUST be listed in the Software Release Note
	• Changes without Change Forms is not allowed to check-in as well as not allow to release
	• Need to prepare a "SRN Checklist" to ease of software release
	• To add-on following fields:
	  • Affected Clients
	  • Functional Specification (Y / N)

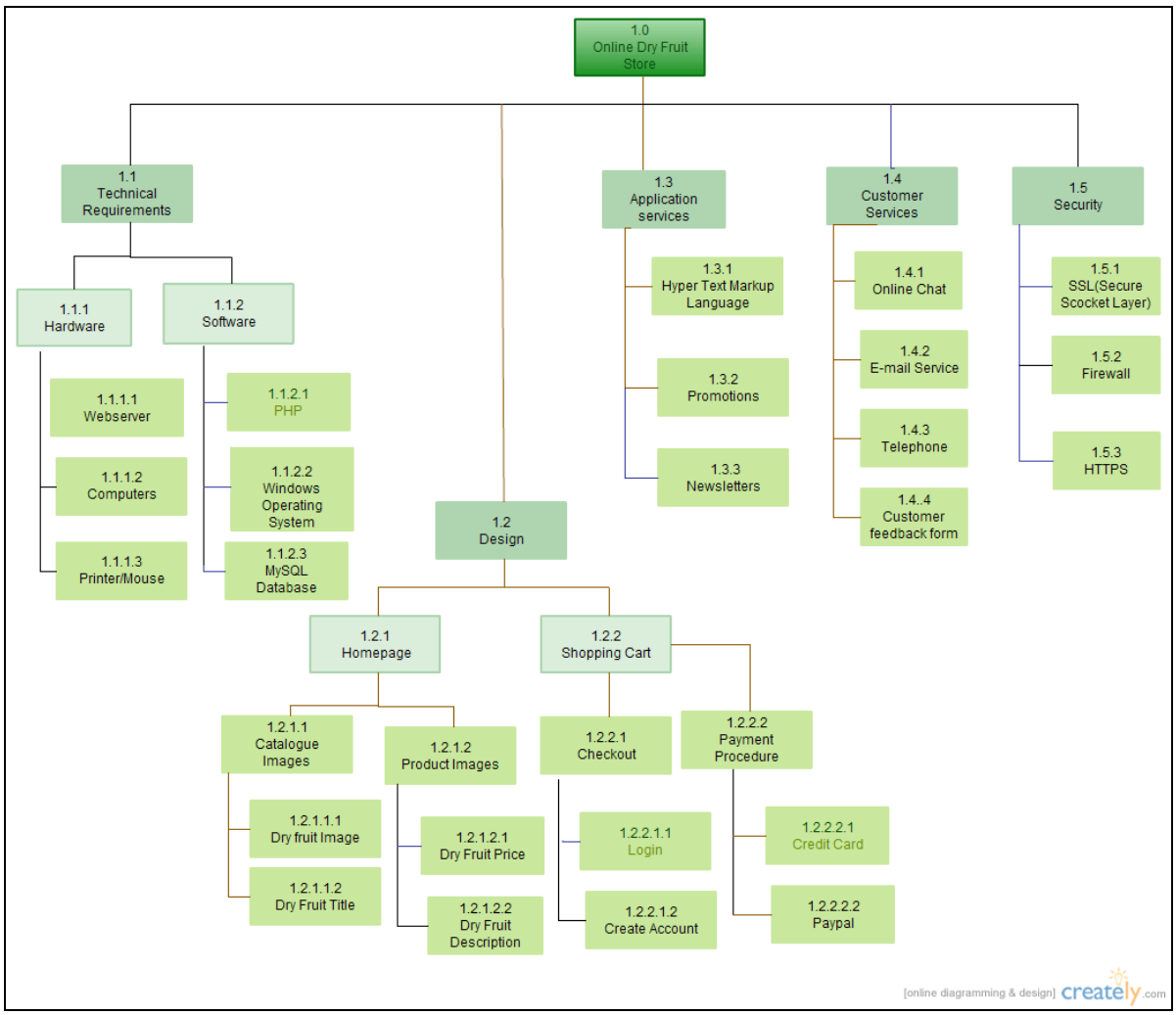
7	**Post Release (System-release and Patch-release)**
	• A meeting of lesson-learn with all team members with official minutes is mandatory
	• Items for discussion are:
	  ○ What are the things/events/items/scenario that the team has done wrong?
	  ○ What are the things/events/items/scenario that the team has done right?
	  ○ What are the things/events/items/scenario that the team needs improvement?

Assignment: Project Background

Your company recently would like to tender an **online website development project**. If your company were to secure this project, the utilization of the company resources achieve 100% for coming two years. However, **this project only give consideration to company that has software quality assurance in place**.

Your company has decided to tender for this project and you as the project manager for the company were directed to work with department of quality assurance to develop a **complete and comprehensive project quality plan and software quality assurance plan** in preparation tendering this project in four months time.

Following is the work breakdown structure for the online website development project. You are required to **ensure all aspects of level-1 tasks are taken into consideration into both the project quality plan and software quality assurance plan**.



Project Quality Plan (40 marks)

Part A: (10 marks)

Using the **online website development project**, discuss the importance and activities of software quality assurance.

Part B: (30 marks)

Using the approach of ISO9001:2015, develop a **Information Technology Project Quality Plan** for **online website development project,** comprising the following:

- Introduction (2%)
- Abbreviations & Definitions (2%)
- References (project documents, standards, other standards if any) (2%)
- Quality Objective (quality policy, project quality objective, ISO Certification) (2%)
- Roles and Responsibilities (quality organization chart, QA and QC team role and responsibilities) (2%)
- Project Quality Management Systems (covering project life cycle and system development life cycle) (10%)
- Documentation Management Plan (2%)
- Training (2%)
- Audits (2%)
- Tracking, Monitoring and Controls (2%)
- Management Review and Responsibilities (2%)

Hints and Tips: IT Documentation Framework Definitions

Policy: A formal, brief, and high-level statement or plan that embraces an organization's general beliefs, goals, objectives, and acceptable procedures for a specified subject area. Policies always state required actions, and may include pointers to standards. Policy attributes include the following:

- Require compliance (mandatory)
- Failure to comply results in disciplinary action
- Focus on desired results, not on means of implementation
- Further defined by standards and guidelines

Standard: A mandatory action or rule designed to support and conform to a policy.

- A standard should make a policy more meaningful and effective.
- A standard must include one or more accepted specifications for hardware, software, or behavior.

Guideline: General statements, recommendations, or administrative instructions designed to achieve the policy's objectives by providing a framework within which to implement procedures.

- A guideline can change frequently based on the environment and should be reviewed more frequently than standards and policies.
- A guideline is not mandatory, rather a suggestion of a best practice. Hence "guidelines" and "best practice" are interchangeable

Procedures: Procedures describe the process: who does what, when they do it, and under what criteria. They can be text based or outlined in a process map. Represent implementation of Policy.

- A series of steps taken to accomplish an end goal.
- Procedures define "how" to protect resources and are the mechanisms to enforce policy.
- Procedures provide a quick reference in times of crisis.
- Procedures help eliminate the problem of a single point of failure.
- Also known as a SOP (Standard Operating Procedure)

Work Instructions: Describe how to accomplish a specific job. Visual aids, various forms of job aids, or specific assembly instructions are examples of work instructions. Work instructions are specific.

Forms and Other Documents: Forms are documentation that is used to create records, checklists, templates, surveys, or other documentation used in the creation of a product or service. Records are a critical output of any procedure or work instruction and form the basis of process communication, audit material, and process improvement initiatives.

Software Quality Assurance Plan (60 marks)

Software Quality Assurance Plan (60 marks)

Using the **online website development project**, develop the software quality assurance plan for the **online website development project**, comprising the followings:

- Deliverables (list of software work packages and development status, submission requirements) (4%)
- Software Development Lifecycle (identification of lifecycle phases, scope of work for each phase, input and output document for each phase, requirement management) (8%)
- Metrics (testing, software quality) (8%)
- Reviews and audits (formal software design reviews, internal software quality audits, external software quality audits, coding inspections, assessment of software integration and testing) (8%)
- Testing and Validation (software test and software validation) (4%)
- Software Configuration Management (4%)
- Problem Reporting and Corrective Action (4%)
- Tools, Techniques and Methodology (4%)
- Process Flow of Change Control Management (from user submission of user requirement list to acceptance of scope statements, execution of scope/functionality, verification and validation) (8%)
- Development of Forms and Other Documents (change request form, test form, software release form, test script form, configuration management form) (8%)

Assignment Submission Checklist

- **Cover Page (Provided by the lecturer, WBLE)**
- Project Quality Plan and Software Quality Assurance Plan
- Title Page
- Table of Content
- Reference Document (MUST have)
- **CD is a MUST (Project Quality Plan and Software Quality Assurance Plan with workflows, chartings and forms)**