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Software Project Management - A Mapping between RUP and the PMBOK

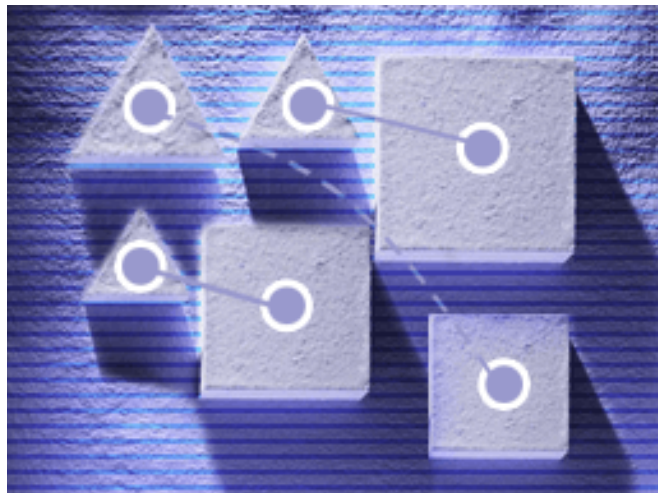
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from The Rational Edge: This paper compares the Rational Unified Process (RUP) with the PMI's "Project Management Body of Knowledge" (PMBOK) and provides a mapping between best practices in the RUP project management discipline and best practices in the PMBOK.

Many organizations wish to standardize their software engineering practices as well as their project management (PM) practices, and two well-known processes are available to help in both these areas, respectively. The IBM® Rational® Unified Process,® or RUP®, offers a prescriptive approach for standardizing on software engineering best practices, and the Project Management Institute® (PMI®) Guide to the Project Management



Body of Knowledge® (PMBOK®) offers a descriptive approach for standardizing on project management best practices. With both these approaches available to organizations, the question becomes: Are they compatible? The simple answer is, "Yes."

This paper provides a more elaborate answer to that question by mapping the RUP project management (PM) discipline best practices to the PMBOK best practices. Throughout this mapping, I will highlight the similarities and differences between them. Essentially, the RUP focuses on PM best practices in the context of software development and deployment projects while the PMBOK best practices are generic and applicable to management of projects in any application domain — from building a bridge to implementing new business processes in a company. So, from an application domain standpoint, the RUP PM discipline is a specific instance of the PMBOK's generic PM best practices.

The RUP PM best practices identified in this paper are those described under the PM discipline within RUP¹; other best practices more or less related to PM are described under other RUP disciplines, such as business modeling, requirements, analysis and design, implementation, test, deployment, environment, and configuration and change management, and when necessary this paper refers to those disciplines as well. The PMI PM best practices identified in this paper are described in the PMBOK².

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RUP overview

RUP is a software engineering process that describes who does what, when, and how in a software development and deployment project. It has the characteristics of being use-case driven, architecture-centric, risk-driven, and iterative.

Let's consider each of these important characteristics. Throughout a project guided by RUP, functional requirements expressed in the form of use cases drive the realization of the application's executable architecture. In addition, the process focuses team effort on building the important behavioral and structural elements of the application (the architectural elements) before building the less important elements. Mitigation of the most important risk elements drives the scope definition of the early iterations of its lifecycle. And finally, RUP partitions the software development lifecycle into iterations that produce incremental versions of the executable application.

RUP implements the following software engineering best practices:

1. Develop iteratively
2. Manage requirements
3. Use component architectures
4. Model visually
5. Continuously verify quality
6. Manage change

Dimensions of RUP

RUP implements the best practices listed above within a two-dimensional process. One dimension describes "disciplines" while the other dimension describes "phases" within the lifecycle of the process. Figure 1 shows a high-level graphical representation of the process.

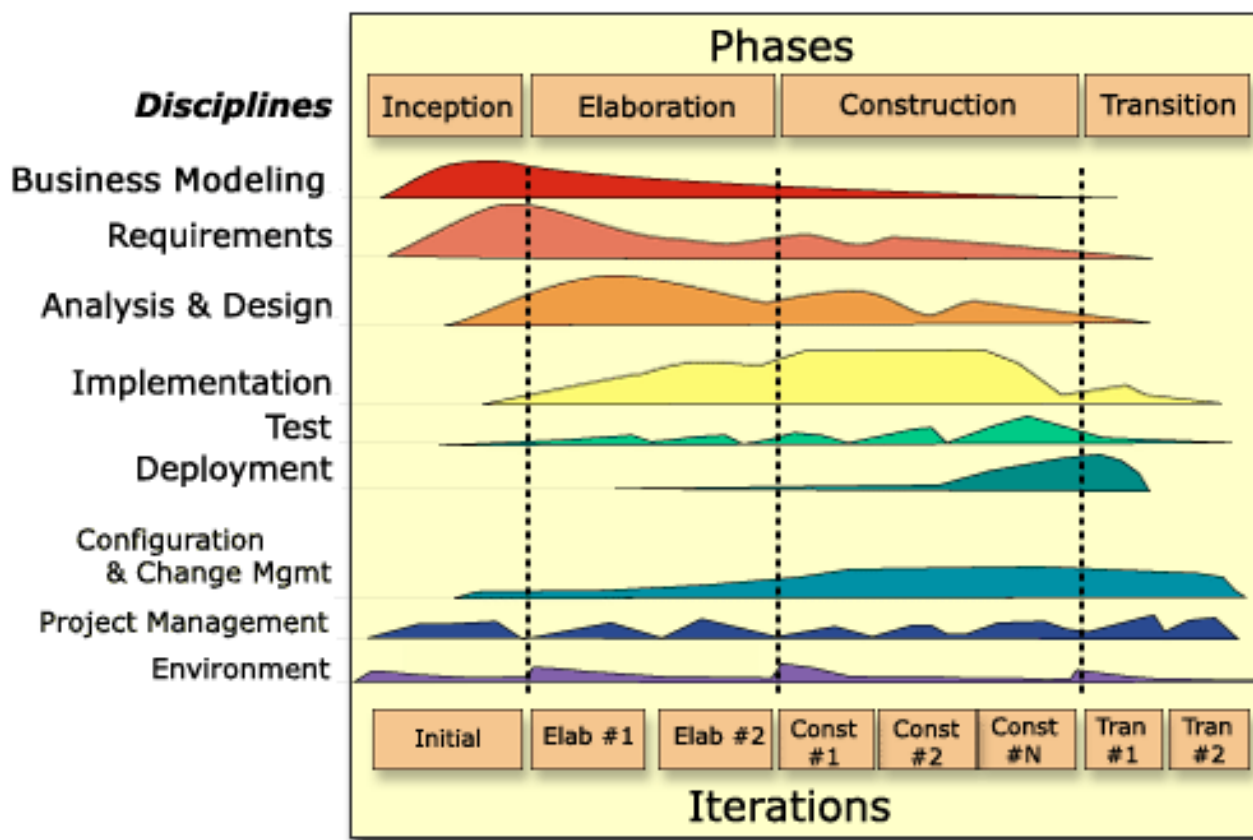


Figure 1: Rational Unified Process

RUP disciplines

RUP disciplines are clearly related to the six best practices, but more closely represent individual roles for members or subgroups within the full development team. These disciplines are:

1. Business modeling
2. Requirements
3. Analysis and design
4. Implementation
5. Test
6. Deployment
7. Project management
8. Environment
9. Configuration and change management

Within RUP, each discipline is expressed in terms of roles (*who* performs the task), activities (*how* they perform these tasks), and artifacts (*what* the activity achieves). A role defines the behavior and responsibilities of an individual, or a group of individuals, responsible for activities and artifacts. An activity is a task for which a role is responsible and may be asked to perform. It describes the steps required to create or update one or many artifacts. An artifact is an input and/or an output to an activity. Other elements supplement these three key elements, such as concepts, work guidelines, tool mentors, reports, artifact guidelines, templates, and checkpoints.

Figure 2 shows a graphical representation of roles, artifacts, activities and other supplemental RUP elements.

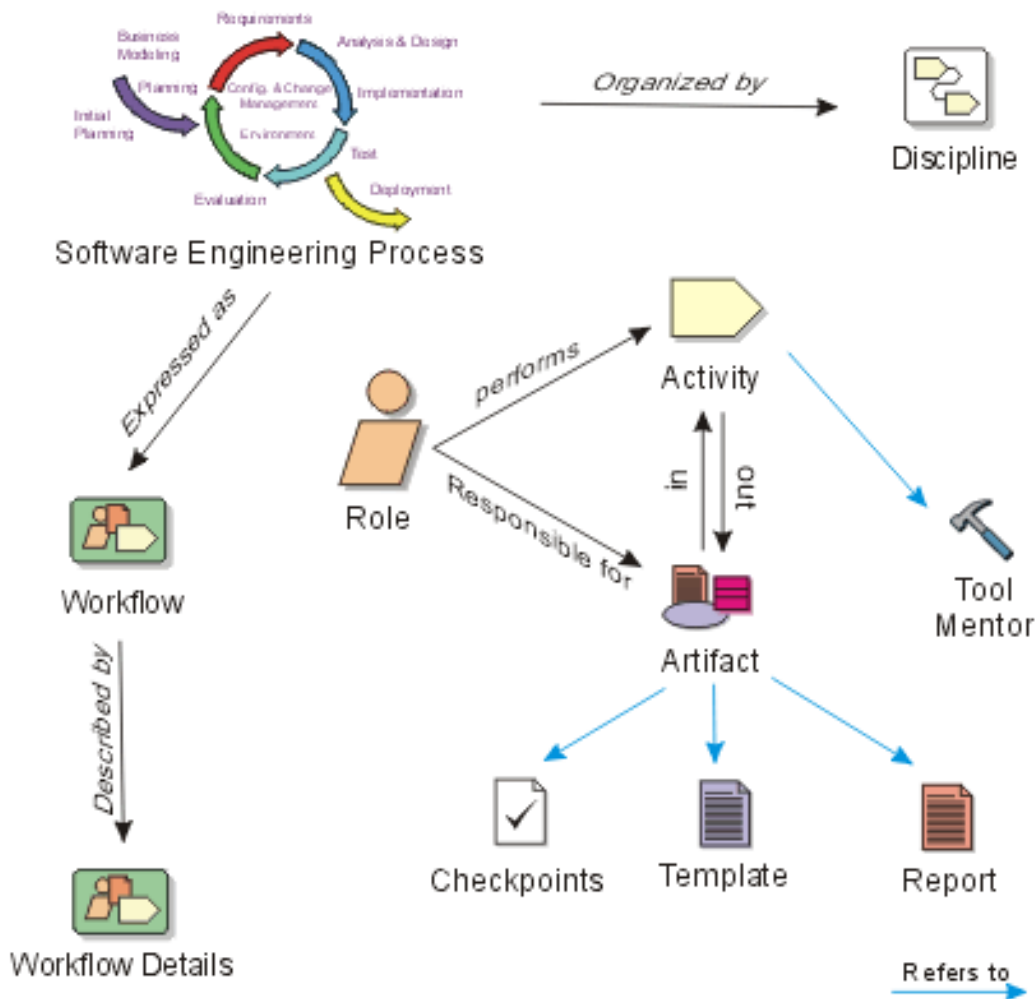


Figure 2: Roles, activities, and artifacts

RUP lifecycle

As noted earlier, the RUP lifecycle is iterative, and its lifecycle dimension is divided into four phases:

1. Inception
2. Elaboration
3. Construction
4. Transition

Each phase has a clearly defined set of objectives and ends with a major milestone. The milestones at the end of each phase are:

1. Lifecycle objective at the end of Inception
2. Lifecycle architecture at the end of Elaboration
3. Initial operational capability at the end of Construction
4. Product release at the end of Transition

The goal of Inception is to define the project scope. The goal of Elaboration is to build an executable architecture for the application. The goal of Construction is to flesh out the architectural skeleton with most of the application's capabilities. And finally, the goal of Transition is to transition the application to the end-user community.

Each RUP phase is further divided into iterations, each ending with a minor milestone.

The RUP PM discipline

Of the RUP disciplines noted earlier, we are concerned with the project management (PM) discipline. The RUP defines software PM as the art of balancing competing objectives, managing risk, and overcoming constraints to successfully deliver a product that meets the needs of both customers (those who require the software to be developed) and the software users.

The RUP PM discipline provides:

1. A framework for managing software-intensive projects
2. Practical guidelines for planning, staffing, executing, and monitoring projects
3. A framework for managing risk

This discipline focuses mainly on the important aspects of an iterative development process:

1. Risk management
2. Planning an iterative project, through the lifecycle and for a particular iteration
3. Monitoring progress of an iterative project, metrics

A RUP/PMBOK comparison

Here I should point out several areas of management that fall outside the scope of the RUP PM discipline, but which are covered by PMBOK practices:

1. Managing people: Hiring, training, coaching (maps to PMBOK Project Human Resource Management knowledge area)
2. Managing budget: Defining, allocating, and so forth (maps to PMBOK Project Cost Management knowledge area)
3. Managing contracts: With suppliers and customers (maps to PMBOK Project Procurement Management knowledge area)

We will discuss PMBOK knowledge areas in more detail later. For now, simply note that three of the nine PMBOK knowledge areas have no equivalent RUP discipline: Human Resource Management, Cost Management, and Procurement Management. However the Human Resource Management Organizational Planning process maps to the "roles" aspect of RUP, as its purpose is to identify, document, and assign project roles and responsibilities.

Primary RUP PM artifacts

Numerous artifacts are created within the RUP PM discipline. The main artifacts are listed here, with the number of instances created in a typical project shown in parentheses:

- Software Development Plan (one)
 - Quality Assurance Plan
 - Risk Management Plan
 - Measurement Plan
 - Product Acceptance Plan
 - Problem Resolution Plan
- Business Case (one)
- Iteration Plan (many)
- Iteration Assessment (many)
- Status Assessment (many)
- Risk List (one)
- Work Order (many)
- Issues List (one)
- Project Measurements (many)

We want to map RUP characteristics to those found in the PMBOK, I will delve a bit further into the artifacts listed above and characterize four of them:

1. The Software Development Plan is:

- Created in the Inception phase
- Updated throughout lifecycle
- Outlined as follows:
 - Project Overview
 - Project purpose, scope and objectives
 - Assumptions and constraints
 - Project deliverables
 - Project Organization
 - Organizational structure
 - External interfaces
 - Roles and responsibilities
 - Management Process
 - Project estimates
 - Project plan
 - Iteration plans
 - Project monitoring and control
 - Other Plans

2. The Iteration Plan is:

- Created once per iteration
- Outlined as follows:
 - Plan
 - Resources

- Use cases
- Evaluation criteria

3. The Vision is:

- Not a PM artifact (Requirements artifact)
- Created in the Inception phase
- Outlined as follows:
 - Positioning
 - Business opportunity
 - Problem statement
 - Product position statement
 - Stakeholder and user descriptions
 - Stakeholder descriptions
 - User descriptions
 - Stakeholder needs
 - Product overview
 - Product features
 - Constraints
 - Other information

4. The Business Case is:

- Created in the Inception phase
- Outlined as follows:
 - Product description
 - Business context
 - Product objectives
 - Financial forecast
 - Constraints

PMBOK overview

Now, let's turn our attention to the PMBOK. The PMBOK describes a set of generally accepted practices that PM practitioners can use to manage all types of projects, including software development and deployment projects.

The PMBOK defines a project as "a temporary endeavor undertaken to create a unique product or service." It defines PM as "the application of knowledge, skills, tools, and techniques to project activities to meet project requirements."

Dimensions of PMBOK

The PMBOK presents PM practices in logical groupings. One dimension describes "knowledge areas" while the other dimension describes project management processes split into five process groups. Figure 3 shows a high-level graphical representation of all 39 PM processes.³

Process Groups Knowledge Area	Initiating	Planning	Executing	Controlling	Closing
4. Project Integration Management		4.1 Project Plan Development	4.2 Project Plan Execution	4.3 Integrated Change Control	
5. Project Scope Management	5.1 Initiation	5.2 Scope Planning 5.3 Scope Definition		5.4 Scope Verification 5.5 Scope Change Control	
6. Project Time Management		6.1 Activity Definition 6.2 Activity Sequencing 6.3 Activity Duration Estimating 6.4 Schedule Development		6.5 Schedule Control	
7. Project Cost Management		7.1 Resource Planning 7.2 Cost Estimating 7.3 Cost Budgeting		7.4 Cost Control	
8. Project Quality Management		8.1 Quality Planning	8.2 Quality Assurance	8.3 Quality Control	
9. Project Human Resource Management		9.1 Organizational Planning 9.2 Staff Acquisition	9.3 Team Development		
10. Project Communications Management		10.1 Communications Planning	10.2 Information Distribution	10.3 Performance Reporting	10.4 Administrative Closure
11. Risk Project Management		11.1 Risk Management Planning 11.2 Risk Identification 11.3 Qualitative Risk Analysis 11.4 Quantitative Risk Analysis 11.5 Risk Response Planning		11.6 Risk Monitoring and Control	
12. Project Procurement Management		12.1 Procurement Planning 12.2 Solicitation Planning	12.3 Solicitation 12.4 Source Selection 12.5 Contract Administration		12.6 Contract Closeout

Figure 3: PMBOK PM processes

[Click to enlarge](#)

PMBOK knowledge areas and process groups

The PMBOK knowledge areas are:

1. Project Integration Management
2. Project Scope Management
3. Project Time Management
4. Project Cost Management
5. Project Quality Management
6. Project Human Resource Management
7. Project Communications Management
8. Project Risk Management
9. Project Procurement Management

Each PMBOK knowledge area describes project management knowledge and practice in terms of one or more processes. Each process is further described in terms of its inputs, outputs, and tools and techniques. Inputs and outputs are documents or documentable items. Tools and techniques are mechanisms applied to the inputs to create the outputs.

The 39 processes are organized into five process groups:

1. Initiating Processes
2. Planning Processes
3. Executing Processes
4. Controlling Processes
5. Closing Processes

Figure 4 shows a graphical representation of the five process groups.

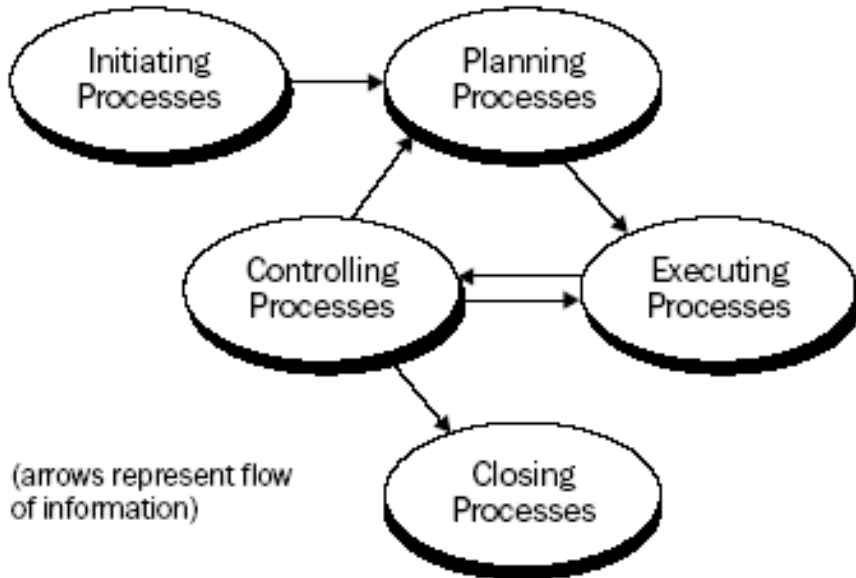


Figure 4: PMBOK process groups

PMBOK lifecycle

The PMBOK does not prescribe any specific lifecycle for projects. It specifies that the project lifecycle should be divided into phases. The number of phases varies based on the project scope and the application domain. It identifies that four to nine phases is typical for any type of project.

PMBOK deliverables

The PMBOK defines a deliverable as "a tangible, verifiable work product such as a feasibility study, a detail design, or a working prototype."

Some of the main PMBOK deliverables are:

- Project Plan (with supporting details)
- Work Results and Change Requests
- Corrective Actions and Lessons Learned
- Project Charter (with constraints and assumptions)

The Project Plan is:

- Created in Project Plan Development process early in the project lifecycle
- Updated throughout the project lifecycle
- Outlined as follows:
 - Project Charter

- Project Management Approach or Strategy
- Scope Statement
 - Project objectives
 - Project deliverables
- Work Breakdown Structure (WBS)
- Cost Estimates, Schedule and Responsibility Assignments for Deliverables
- Measurement Baselines for Scope, Schedule and Cost
- Major Milestones and Target Dates
- Required Staff
- Other Plans

Let's consider one of the Project Plan characteristics: the Project Charter. The Project Charter has its own characteristics, as follows:

- Formally authorizes a project
- Created in the Initiation process early in the project lifecycle
- Outlined as follows:
 - Business Needs
 - Product Description

PMBOK and RUP mapping

The following sections provide mappings between the RUP and the PMBOK. Most of the time RUP elements don't map perfectly to PMBOK elements and vice versa. You should keep in mind that the mapping presented in this paper is how I perceive the way these two standards map to each other. It is certainly possible to produce a slightly different mapping.⁴

For the purpose of mapping the RUP with the PMBOK, the PMBOK is used as the baseline since it is the more generic of the two standards, and RUP is compared to it.

Shared characteristics

Both the RUP and the PMBOK recognize that PM is an iterative undertaking. The PMBOK describes this in the following terms:

It is important to note that many of the processes within project management are iterative in nature. This is in part due to the existence of and the necessity for progressive elaboration in a project throughout the project lifecycle; i.e., the more you know about your project, the better you are able to manage it.

Table 1 provides a mapping between the main characteristics of the PMBOK and RUP.

Table 1: PMBOK and RUP main characteristics.

PMBOK	RUP
Any type of project	Software project specific
Project management practices only	Project management and other software development practices
Covers all aspects of project management	Covers some aspects of project management
Descriptive	Prescriptive
Phases are application domain dependant	Phases and iterations are software development specific

PMBOK to RUP meta-model mapping

Both the RUP and the PMBOK group activities into structural groups and temporal groups. The RUP has structural groups of activities called disciplines and temporal groups of activities called workflows. The PMBOK has structural groups of processes called knowledge areas and temporal groups of processes called process groups.

Table 2 provides a mapping between RUP and PMBOK meta-models.

Table 2: PMBOK to RUP meta-model mapping

Element	PMBOK	RUP
Project Type	Any type of project	Software development and deployment projects
Project Lifecycle	Divided into Phases. Typically 4 or 5. Sometimes up to 9 or more. Each phase is marked by completion of one or more deliverables.	Divided into 4 phases: Inception, Elaboration, Construction and Transition. Each phase is divided into one or multiple iterations that include activities from all the disciplines. Each iteration produces an executable version of the software application or system.
End of Phase	Milestone	Major Milestone
End of Phase Artifact	Deliverable	Artifact
Activity	Process described in terms of inputs, outputs, tools and techniques.	Activity described in terms of input artifacts, resulting artifacts, and steps with tool mentors and guidelines.
Input Artifact	Input	Input Artifact
Output Artifact	Output	Resulting Artifact
End of Phase Review	Phase Exits, Stage Gates or Kill Points	Lifecycle Milestone Review
Structural Activity Grouping	Knowledge Area	Discipline
Temporal Activity Grouping	Process Group	Workflow

Mapping PMBOK knowledge areas to RUP disciplines

Table 3 provides a mapping between PMBOK knowledge areas and RUP disciplines.

Table 3: PMBOK knowledge areas to RUP disciplines mapping.

PMBOK® Knowledge Area	RUP® Discipline
Project Integration Management	<ul style="list-style-type: none"> • Project Management • Requirements • Deployment • Configuration & Change Management
Project Scope Management	<ul style="list-style-type: none"> • Project Management • Requirements • Configuration & Change Management
Project Time Management	Project Management
Project Cost Management	Project Management
Project Quality Management	<ul style="list-style-type: none"> • Project Management • Configuration & Change Management
Project Human Resource Management	Project Management
Project Communications Management	Project Management
Project Risk Management	Project Management
Project Procurement Management	Requirements

Mapping PMBOK processes to RUP activities

Table 4 provides a mapping between PMBOK processes and RUP activities. It presents PMBOK processes grouped by knowledge areas using the following format: <PMBOK Section Number> <Knowledge Area> → <Process>. It presents the corresponding RUP activities using the following format: <Discipline> → <Activity>.

Table 4: PMBOK processes to RUP activities mapping.

PMBOK® Processes	RUP® Activities
4.1 Project Integration Management → Project Plan Development	<ul style="list-style-type: none"> ● Project Management → Plan Phases and Iterations ● Project Management → Develop Iteration Plan ● Project Management → Develop Product Acceptance Plan ● Project Management → Compile Software Development Plan ● Project Management → Develop Business Case ● Requirements → Develop Vision ● Deployment → Develop Deployment Plan ● <i>All Environment activities</i>
4.2 Project Integration Management → Project Plan Execution	<ul style="list-style-type: none"> ● Project Management → Monitor Project Status ● Project Management → Schedule and Assign Work ● Project Management → Report Status ● Project Management → Handle Exceptions and Problems ● Configuration & Change Management → Submit Change Request ● Configuration & Change Management → Update Change Request ● <i>All Business Modeling, Requirements, Analysis and Design, Implementation, Test, Deployment and Configuration & Change Management activities not already identified</i>
4.3 Project Integration Management → Integrated Change Control	<ul style="list-style-type: none"> ● Configuration & Change Management → Review Change Request ● Configuration & Change Management → Confirm Duplicate or Rejected CR ● See 4.1 Project Integration Management → Project Plan Development ● Project Management → Report Status ● Project Management → Assess Iteration
5.1 Project Scope Management → Initiation	<ul style="list-style-type: none"> ● Project Management → Initiate Project ● Project Management → Initiate Iteration ● Project Management → Develop Business Case

	<ul style="list-style-type: none"> • Requirements → Develop Vision
5.2 Project Scope Management → Scope Planning	<ul style="list-style-type: none"> • Project Management → Develop Problem Resolution Plan • Requirements → Develop Requirements Management Plan • Configuration and Change Management → Write CM Plan • Requirements → Develop Vision • Requirements → Find Actors and Use Cases • Requirements → Detail a Use Case • Requirements → Detail the Software Requirements • Requirements → Capture Common Vocabulary
5.3 Project Scope Management → Scope Definition	<ul style="list-style-type: none"> • Project Management → Plan Phases and Iterations • Project Management → Develop Iteration Plan • Requirements → Develop Vision • Requirements → Find Actors and Use Cases • Requirements → Detail a Use Case • Requirements → Detail the Software Requirements • Requirements → Capture Common Vocabulary
5.4 Project Scope Management → Scope Verification	<ul style="list-style-type: none"> • Project Management → Lifecycle Milestone Review • Requirements → Review Requirements
5.5 Project Scope Management → Scope Change Control	<ul style="list-style-type: none"> • Project Management → Report Status • Project Management → Assess Iteration • Project Management → Plan Phases and Iterations • Project Management → Develop Iteration Plan • Configuration & Change Management → Submit Change Request • Configuration & Change Management → Update Change Request • Requirements → Develop Vision • Requirements → Find Actors and Use Cases • Requirements → Detail a Use Case • Requirements → Detail the Software Requirements • Requirements → Capture Common Vocabulary

6.1 Project Time Management → Activity Definition	<ul style="list-style-type: none"> • Project Management → Plan Phases and Iterations • Project Management → Develop Iteration Plan
6.2 Project Time Management → Activity Sequencing	<ul style="list-style-type: none"> • Project Management → Plan Phases and Iterations • Project Management → Develop Iteration Plan
6.3 Project Time Management → Activity Duration Estimating	<ul style="list-style-type: none"> • Project Management → Plan Phases and Iterations • Project Management → Develop Iteration Plan
6.4 Project Time Management → Schedule Development	<ul style="list-style-type: none"> • Project Management → Plan Phases and Iterations • Project Management → Develop Iteration Plan • Project Management → Develop Problem Resolution Plan
6.5 Project Time Management → Schedule Control	<ul style="list-style-type: none"> • Project Management → Report Status • Project Management → Assess Iteration
7.1 Project Cost Management → Resource Planning	Project Management → Acquire Staff
7.2 Project Cost Management → Cost Estimating	Project Management → Plan Phases and Iterations
7.3 Project Cost Management → Cost Budgeting	No mapping to RUP®
7.4 Project Cost Management → Cost Control	No mapping to RUP®

8.1 Project Quality Management → Quality Planning	<ul style="list-style-type: none"> • Project Management → Develop Quality Assurance Plan • Project Management → Define Monitoring and Control Processes • Project Management → Develop Measurement Plan
8.2 Project Quality Management → Quality Assurance	<ul style="list-style-type: none"> • Configuration & Change Management → Submit Change Request • Configuration & Change Management → Update Change Request
8.3 Project Quality Management → Quality Control	<ul style="list-style-type: none"> • Configuration & Change Management → Submit Change Request • Configuration & Change Management → Update Change Request • <i>All Review Activities across all Disciplines</i> • <i>All Test Discipline Activities</i>
9.1 Project Human Resource Management → Organizational Planning	Project Management → Define Project Organization and Staffing
9.2 Project Human Resource Management → Staff Acquisition	Project Management → Acquire Staff
9.3 Project Human Resource Management → Team Development	No mapping to RUP®
10.1 Project Communications Management → Communication Planning	Project Management → Compile Project Development Plan
10.2 Project Communications Management → Information Distribution	<ul style="list-style-type: none"> • Project Management → Report Status • Project Management → Assess Iteration
10.3 Project Communications	<ul style="list-style-type: none"> • Project Management → Define Monitoring and

Management → Performance Reporting	<p>Control Processes</p> <ul style="list-style-type: none"> • Configuration & Change Management → Submit Change Request • Configuration & Change Management → Update Change Request
10.4 Project Communications Management → Administrative Closure	<ul style="list-style-type: none"> • Project Management → Assess Iteration • Project Management → Prepare for Phase Close-Out • Project Management → Prepare for Project Close-Out
11.1 Risk Project Management → Risk Management Planning	Project Management → Develop Risk Management Plan
11.2 Project Risk Management → Risk Identification	<ul style="list-style-type: none"> • Project Management → Identify and Assess Risks • Configuration & Change Management → Submit Change Request • Configuration & Change Management → Update Change Request
11.3 Project Risk Management → Qualitative Risk Analysis	Project Management → Identify and Assess Risks
11.4 Project Risk Management → Quantitative Risk Analysis	Project Management → Identify and Assess Risks
11.5 Project Risk Management → Risk Response Planning	<ul style="list-style-type: none"> • Project Management → Identify and Assess Risks • Configuration & Change Management → Submit Change Request • Configuration & Change Management → Update Change Request
11.6 Project Risk Management → Risk Monitoring and Control	<ul style="list-style-type: none"> • Project Management → Identify and Assess Risks • Configuration & Change Management → Submit Change Request • Configuration & Change Management → Update Change Request

12.1 Project Procurement Management → Procurement Planning	No mapping to RUP®
12.2 Project Procurement Management → Solicitation Planning	Requirements → Develop Vision
12.3 Project Procurement Management → Solicitation	No mapping to RUP®
12.4 Project Procurement Management → Source Selection	No mapping to RUP®
12.5 Project Procurement Management → Contract Administration	No mapping to RUP®
12.6 Project Procurement Management → Contract Closeout	No mapping to RUP®

Mapping PMBOK process outputs to RUP artifacts

Table 5 provides a mapping between the PMBOK process outputs and the RUP artifacts. It presents the PMBOK outputs using the following format: <PMBOK Section Number> <Knowledge Area> → <Process> → <Output>. It presents the corresponding RUP artifacts using the following format: <Discipline> → <Output Artifact> (<Artifact State>) [<Artifact Section>].

Table 5: PMBOK process outputs to RUP artifacts mapping.

PMBOK® Outputs	RUP Artifacts
4.1 Project Integration Management → Project Plan Development → Project Plan	<ul style="list-style-type: none"> ● Project Management → Software Development Plan ● Project Management → Business Case ● Project Management → Iteration Plan ● Requirements → Vision ● Environment → Development Case
4.1 Project Integration Management → Project Plan Development → Supporting Detail	<ul style="list-style-type: none"> ● Project Management → Risk Management Plan ● Project Management → Measurement Plan ● Project Management → Product Acceptance Plan ● Project Management → Quality Assurance Plan ● Project Management → Problem Resolution Plan ● Requirements → Requirements Management Plan ● Configuration & Change Management → Configuration Management Plan ● Environment → Business Modeling Guidelines ● Environment → User-Interface Guidelines ● Environment → Use-Case Modeling Guidelines ● Environment → Design Guidelines ● Environment → Programming Guidelines ● Environment → Test Guidelines ● Environment → Manual Styleguide ● Environment → Tool Guidelines
4.2 Project Integration Management → Project Plan Execution → Work Result	All RUP® artifacts
4.2 Project Integration Management → Project Plan Execution → Change Request	Configuration & Change Management → Change Request
4.3 Project Integration Management → Integrated Change Control → Project Plan Updates	<ul style="list-style-type: none"> ● Configuration & Change Management → Change Request ● See 4.1 Project Integration Management → Project Plan Development → Project Plan (updated) ● See 4.1 Project Integration Management → Project

	Plan Development → Supporting Detail (updated)
4.3 Project Integration Management → Integrated Change Control → Corrective Action	<ul style="list-style-type: none"> • Project Management → Status Assessment • Project Management → Iteration Assessment
4.3 Project Integration Management → Integrated Change Control → Lessons Learned	<ul style="list-style-type: none"> • Project Management → Status Assessment • Project Management → Iteration Assessment
5.1 Project Scope Management → Initiation → Project Charter	<ul style="list-style-type: none"> • Project Management → Business Case • Requirements → Vision
5.1 Project Scope Management → Initiation → Project Manager Identified/Assigned	<ul style="list-style-type: none"> • Project Management → Software Development Plan • Project Management → Iteration Plan
5.1 Project Scope Management → Initiation → Constraints	<ul style="list-style-type: none"> • Project Management → Software Development Plan [Assumptions and Constraints]
5.1 Project Scope Management → Initiation → Assumptions	<ul style="list-style-type: none"> • Project Management → Software Development Plan [Assumptions and Constraints]
5.2 Project Scope Management → Scope Planning → Scope Statement	<ul style="list-style-type: none"> • Requirements → Vision • Requirements → Software Requirements Specifications
5.2 Project Scope Management → Scope Planning → Supporting Details	Requirements → Glossary
5.2 Project Scope Management → Scope Planning → Scope Management Plan	<ul style="list-style-type: none"> • Requirements → Requirements Management Plan • Configuration & Change Management → Configuration Management Plan • Project Management → Problem Resolution Plan
5.3 Project Scope Management → Scope Definition → Work Breakdown Structure	<ul style="list-style-type: none"> • Project Management → Software Development Plan [Project Plan] • Project Management → Iteration Plan [Plan]

5.3 Project Scope Management → Scope Definition → Scope Statement Updates	<ul style="list-style-type: none"> • Requirements → Vision (updated) • Requirements → Software Requirements Specifications (updated)
5.4 Project Scope Management → Scope Verification → Formal Acceptance	<ul style="list-style-type: none"> • Successfully reached the Lifecycle Objectives Milestone at the end of the Inception phase • Review Record
5.5 Project Scope Management → Scope Change Control → Scope Change	Configuration & Change Management → Change Request (accepted)
5.5 Project Scope Management → Scope Change Control → Corrective Action	<ul style="list-style-type: none"> • Project Management → Status Assessment • Project Management → Iteration Assessment
5.5 Project Scope Management → Scope Change Control → Lessons Learned	<ul style="list-style-type: none"> • Project Management → Status Assessment • Project Management → Iteration Assessment
5.5 Project Scope Management → Scope Change Control → Adjusted Baseline	<ul style="list-style-type: none"> • Project Management → Software Development Plan (new baseline) • Project Management → Iteration Plan (new baseline) • Requirements → Vision (new baseline) • Requirements → Software Requirements Specifications (new baseline)
6.1 Project Time Management → Activity Definition → Activity List	<ul style="list-style-type: none"> • Project Management → Software Development Plan • Project Management → Iteration Plan
6.1 Project Time Management → Activity Definition → Supporting Detail	<ul style="list-style-type: none"> • Project Management → Software Development Plan • Project Management → Iteration Plan
6.1 Project Time Management → Activity Definition → Work Breakdown Structure Updates	<ul style="list-style-type: none"> • Project Management → Software Development Plan (updated) • Project Management → Iteration Plan (updated)

6.2 Project Time Management → Activity Sequencing → Project Network Diagrams	<ul style="list-style-type: none"> • Project Management → Software Development Plan • Project Management → Iteration Plan
6.2 Project Time Management → Activity Sequencing → Activity List Updates	<ul style="list-style-type: none"> • Project Management → Software Development Plan (updated) • Project Management → Iteration Plan (updated)
6.3 Project Time Management → Activity Duration Estimating → Activity Duration Estimates	<ul style="list-style-type: none"> • Project Management → Software Development Plan • Project Management → Iteration Plan
6.3 Project Time Management → Activity Duration Estimating → Basis Of Estimates	<ul style="list-style-type: none"> • Project Management → Software Development Plan • Project Management → Iteration Plan
6.3 Project Time Management → Activity Duration Estimating → Activity List Updates	<ul style="list-style-type: none"> • Project Management → Software Development Plan (updated) • Project Management → Iteration Plan (updated)
6.4 Project Time Management → Schedule Development → Project Schedule	<ul style="list-style-type: none"> • Project Management → Software Development Plan • Project Management → Iteration Plan
6.4 Project Time Management → Schedule Development → Supporting Detail	<ul style="list-style-type: none"> • Project Management → Software Development Plan • Project Management → Iteration Plan
6.4 Project Time Management → Schedule Development → Schedule Management Plan	Project Management → Problem Resolution Plan
6.4 Project Time Management → Schedule Development → Resource Requirement Updates	<ul style="list-style-type: none"> • Project Management → Software Development Plan (updated) • Project Management → Iteration Plan (updated)

6.5 Project Time Management → Schedule Control → Schedule Updates	<ul style="list-style-type: none"> • Project Management → Software Development Plan (updated) • Project Management → Iteration Plan (updated)
6.5 Project Time Management → Schedule Control → Corrective Action	<ul style="list-style-type: none"> • Project Management → Status Assessment • Project Management → Iteration Assessment
6.5 Project Time Management → Schedule Control → Lessons Learned	<ul style="list-style-type: none"> • Project Management → Status Assessment • Project Management → Iteration Assessment
7.1 Project Cost Management → Resource Planning → Resource Requirements	<ul style="list-style-type: none"> • Project Management → Software Development Plan • Project Management → Iteration Plan
7.2 Project Cost Management → Cost Estimating → Cost Estimates	<ul style="list-style-type: none"> • Project Management → Software Development Plan • Project Management → Iteration Plan
7.2 Project Cost Management → Cost Estimating → Supporting Detail	<ul style="list-style-type: none"> • Project Management → Software Development Plan • Project Management → Iteration Plan
7.2 Project Cost Management → Cost Estimating → Cost Management Plan	Project Management → Problem Resolution Plan
7.3 Project Cost Management → Cost Budgeting → Cost Baseline	<ul style="list-style-type: none"> • Project Management → Software Development Plan (baselined) • Project Management → Iteration Plan (baselined)
7.4 Project Cost Management → Cost Control → Revised Cost Estimates	<ul style="list-style-type: none"> • Project Management → Software Development Plan (updated) • Project Management → Iteration Plan (updated)
7.4 Project Cost Management → Cost Control → Budget Updates	<ul style="list-style-type: none"> • Project Management → Software Development Plan (updated) • Project Management → Iteration Plan (updated)
7.4 Project Cost Management → Cost Control → Corrective Action	<ul style="list-style-type: none"> • Project Management → Software Development Plan • Project Management → Iteration Plan

7.4 Project Cost Management → Cost Control → Estimate at Completion	<ul style="list-style-type: none"> • Project Management → Software Development Plan (updated) • Project Management → Iteration Plan (updated)
7.4 Project Cost Management → Cost Control → Project Closeout	<ul style="list-style-type: none"> • Project Management → Software Development Plan • Project Management → Iteration Plan
7.4 Project Cost Management → Cost Control → Lessons Learned	<ul style="list-style-type: none"> • Project Management → Software Development Plan • Project Management → Iteration Plan
8.1 Project Quality Management → Quality Planning → Quality Management Plan	Project Management → Quality Assurance Plan
8.1 Project Quality Management → Quality Planning → Operational Definitions	Project Management → Measurement Plan
8.1 Project Quality Management → Quality Planning → Checklists	RUP® Checkpoints
8.1 Project Quality Management → Quality Planning → Input to Other Processes	No mapping to RUP®
8.2 Project Quality Management → Quality Assurance → Quality Improvement	Configuration & Change Management → Change Request
8.3 Project Quality Management → Quality Control → Quality Improvement	Configuration & Change Management → Change Request
8.3 Project Quality Management → Quality Control → Acceptance Decisions	Project Management → Review Record

8.3 Project Quality Management → Quality Control → Rework	Any artifact (updated)
8.3 Project Quality Management → Quality Control → Completed Checklists	RUP® Checkpoints
8.3 Project Quality Management → Quality Control → Process Adjustments	<ul style="list-style-type: none"> • Configuration & Change Management → Change Request • Environment → Development Case (updated)
9.1 Project Human Resource Management → Organizational Planning → Role and Responsibility Assignments	Project Management → Software Development Plan
9.1 Project Human Resource Management → Organizational Planning → Staffing Management Plan	Project Management → Software Development Plan [Staffing Plan and Resource Acquisition Plan]
9.1 Project Human Resource Management → Organizational Planning → Organization Chart	Project Management → Software Development Plan
9.1 Project Human Resource Management → Organizational Planning → Supporting Detail	<ul style="list-style-type: none"> • RUP® Roles • Project Management → Software Development Plan [Training Plan]
9.2 Project Human Resource Management → Staff Acquisition → Project Staff Assigned	Project Management → Software Development Plan
9.2 Project Human Resource Management → Staff Acquisition → Project Team Directory	Project Management → Software Development Plan

9.3 Project Human Resource Management → Team Development → Performance Improvements	No mapping to RUP®
9.3 Project Human Resource Management → Team Development → Input to Performance Appraisals	No mapping to RUP®
10.1 Project Communications Management → Communication Planning → Communication Management Plan	Project Management → Software Development Plan [Reporting Plan]
10.2 Project Communications Management → Information Distribution → Project Records	No mapping to RUP®
10.2 Project Communications Management → Information Distribution → Project Reports	<ul style="list-style-type: none"> • Project Management → Status Assessment • Project Management → Iteration Assessment
10.2 Project Communications Management → Information Distribution → Project Presentations	<ul style="list-style-type: none"> • Project Management → Status Assessment • Project Management → Iteration Assessment
10.3 Project Communications Management → Performance Reporting → Performance Reports	<ul style="list-style-type: none"> • Project Management → Status Assessment • Project Management → Iteration Assessment
10.3 Project Communications Management → Performance Reporting → Change Requests	Configuration & Change Management → Change Request
10.4 Project Communications Management → Administrative Closure → Project Archives	Configuration & Change Management → Project Repository

10.4 Project Communications Management → Administrative Closure → Project Closure	<ul style="list-style-type: none"> • Project Management → Status Assessment • Project Management → Iteration Assessment
10.4 Project Communications Management → Administrative Closure → Lessons Learned	<ul style="list-style-type: none"> • Project Management → Status Assessment • Project Management → Iteration Assessment
11.1 Risk Project Management → Risk Management Planning → Risk Management Plan	Project Management → Risk Management Plan
11.2 Project Risk Management → Risk Identification → Risks	Project Management → Risk List
11.2 Project Risk Management → Risk Identification → Triggers	Project Management → Risk List
11.2 Project Risk Management → Risk Identification → Inputs to Other Processes	Configuration & Change Management → Change Request
11.3 Project Risk Management → Qualitative Risk Analysis → Overall Risk Ranking for the Project	Project Management → Risk List
11.3 Project Risk Management → Qualitative Risk Analysis → List of Prioritized Risks	Project Management → Risk List
11.3 Project Risk Management → Qualitative Risk Analysis → List of Risks for Additional Analysis and Management	Project Management → Risk List
11.3 Project Risk Management → Qualitative Risk Analysis → Trends in Qualitative Analysis Results	Project Management → Risk List

11.4 Project Risk Management → Quantitative Risk Analysis → Prioritized List of Quantified Risks	Project Management → Risk List
11.4 Project Risk Management → Quantitative Risk Analysis → Probabilistic Analysis of the Project	Project Management → Risk List
11.4 Project Risk Management → Quantitative Risk Analysis → Probability of Achieving the Cost and Time Objectives	Project Management → Risk List
11.4 Project Risk Management → Quantitative Risk Analysis → Trends in Quantitative Risk Analysis Results	Project Management → Risk List
11.5 Project Risk Management → Risk Response Planning → Risk Response Plan	Project Management → Risk List
11.5 Project Risk Management → Risk Response Planning → Residual Risks	Project Management → Risk List
11.5 Project Risk Management → Risk Response Planning → Secondary Risks	Project Management → Risk List
11.5 Project Risk Management → Risk Response Planning → Contractual Agreements	Project Management → Risk List

11.5 Project Risk Management → Risk Response Planning → Contingency Reserve Amounts Needed	Project Management → Risk List
11.5 Project Risk Management → Risk Response Planning → Inputs to Other Processes	Configuration & Change Management → Change Request
11.5 Project Risk Management → Risk Response Planning → Inputs to a Revised Project Plan	Configuration & Change Management → Change Request
11.6 Project Risk Management → Risk Monitoring and Control → Workaround Plans	Project Management → Risk List
11.6 Project Risk Management → Risk Monitoring and Control → Corrective Action	Project Management → Risk List
11.6 Project Risk Management → Risk Monitoring and Control → Project Change Requests	Configuration & Change Management → Change Request
11.6 Project Risk Management → Risk Monitoring and Control → Updates to the Risk Response Plan	Project Management → Risk List
11.6 Project Risk Management → Risk Monitoring and Control → Risk Database	Project Management → Risk List

11.6 Project Risk Management → Risk Monitoring and Control → Updates to Risk Identification Checklists	Project Management → Risk List
12.1 Project Procurement Management → Procurement Planning → Procurement Management Plan	No mapping to RUP®
12.1 Project Procurement Management → Procurement Planning → Statement(s) of Work	No mapping to RUP®
12.2 Project Procurement Management → Solicitation Planning → Procurement Documents	No mapping to RUP®
12.2 Project Procurement Management → Solicitation Planning → Procurement Documents → Evaluation Criteria	No mapping to RUP®
12.2 Project Procurement Management → Solicitation Planning → Procurement Documents → Statement of Work Updates	No mapping to RUP®
12.3 Project Procurement Management → Solicitation → Proposals	No mapping to RUP®
12.4 Project Procurement Management → Source Selection → Contract	No mapping to RUP®

12.5 Project Procurement Management → Contract Administration → Correspondence	No mapping to RUP®
12.5 Project Procurement Management → Contract Administration → Contract Changes	No mapping to RUP®
12.5 Project Procurement Management → Contract Administration → Payment Requests	No mapping to RUP®
12.6 Project Procurement Management → Contract Closeout → Contract File	No mapping to RUP®
12.6 Project Procurement Management → Contract Closeout → Formal Acceptance and Closure	No mapping to RUP®

Conclusion

Based on the comparison between RUP and PMBOK, there are no fundamental incompatibilities between the two standards. As highlighted in this paper, different terms are used to describe semantically similar or identical concepts, but nothing in RUP contradicts the PMBOK practices and nothing in PMBOK contradicts the RUP practices.

Notes

¹ See Rational Unified Process 2003.06.01.06. Also: Kruchten, P. *The Rational Unified Process: An Introduction*. Reading, MA: Addison-Wesley, Inc., 2000; and Royce, W. *Software Project Management: A Unified Framework*. Reading, MA: Addison-Wesley, Inc, 1998.

² Project Management Institute (PMI), *A Guide to the Project Management Body of Knowledge (PMBOK)*, 2000.

³ Figure 3 excerpted from *A Guide to the Project Management Body of Knowledge (PMBOK Guide) 2000 Edition*, a publication of the Project Management Institute, 2000. Reproduced here by permission from the PMI.

⁴ Editor's Note: As suggested here, an alternative method for mapping RUP and the PMBOK is described in Bill Cottrell's article, "[Standards, Compliance, and the Rational Unified Process — Part I: Integrating RUP and the PMBOK](#)," also published in this issue of *The Rational Edge*.

About the author



Serge Charbonneau is principal consultant and founder of Xelation Software Corporation. Mr. Charbonneau's expertise is in planning software engineering capability improvement initiatives and successfully realizing these initiatives. Mr. Charbonneau has skills and experience in project management, requirements management, object-oriented analysis and design, and process engineering. During the 5 years prior to founding Xelation Software, Mr. Charbonneau worked for Rational Software where he assisted organizations in implementing the Rational Unified Process (RUP) with the Rational suite of tools. Prior to working for Rational Software, Mr. Charbonneau played different roles in companies developing systems for the aeronautics, military, telecommunications and medical industries.



What do you think of this document?

Killer! (5)

Good stuff (4)

So-so; not bad (3)

Needs work (2)

Lame! (1)

Comments?