

Instructions:

This assignment asks you to consider software lifecycle processes, requirements engineering process phases (RE), and the (RUP) Inception phase. Please complete this assignment in this document and submit your answers to Canvas for At-home Assignment 1 by the due date.

Activity 1: Software Lifecycle Models (12 points)

1. Put the 1st letter of one of the following methodologies to the left of the descriptions: (A)gile (Scrum/XP), (B)uild-n-Fix, (R)UP, (S)ynchronize & Stabilize, (T)heory-W/Spiral, (W)aterfall. (6 points)

<u>Lifecycle Model</u>	<u>Transition Description</u>
<i>W</i>	Inputs and Outputs are well-defined at each phase due to the structured nature of the model. A document-centric approach, this model is costly when you have to stop the current phase and revisit an earlier phase.
<i>S</i>	Nightly integration. Multiple parallel development tracks are frequently synchronized. Made popular by a famous software company and a big reason why their developers sometimes sleep at the office!
<i>B</i>	No process is defined at all, therefore no inputs and outputs are defined.
<i>T</i>	This model emphasizes risk management, prototyping, and planning in addition to implementation. Only worry is it gets “out of control”!
<i>A</i>	Refers to a “people-first” family of methodologies. Eschews “heavy” process activities and documents “tomes” due to the belief “YAGNI”.
<i>R</i>	A popular iterative methodology that emphasizes concurrent software workflows over multiple phases. Explicitly recognizes deployment as a lifecycle phase.

2. For each of the types of applications listed below, do the following: (6 points)

- A. Identify one real-world example of software of that type of application and describe its main software features. Provide a URL to its product page.
- B. For the example, select from the list below which lifecycle model you would recommend being used during development, if you had to develop software with similar features. *You may only choose each model once (so, you cannot just put down “Scrum” for all 3), so I am looking for a “best fit” type answer!* Explain your decisions. Justify why that model is the best fit for that domain.

Applications

1. System software

Application: Kylin

URL: <https://tinyurl.com/v6hkwh>

Features: High security software platform, “high-availability cluster management”

Development Model: Spiral

Development Model Justification: Because security is such a high priority of this Chinese OS, it makes sense that a Spiral model be used to phase out security risks as much as possible. The high need for security alone justifies the use of a Spiral model as opposed to the other processes available to choose from.

2. Business software

Application: Smartsheet

URL: <https://tinyurl.com/2447emua>

Features: Project tracking dashboards, metrics and data visualization, integration with 3rd party productivity systems, etc.

Development Model: Scrum

Development Model Justification: Because Smartsheet is a business productivity application, there is little need to heavily defend the system against risk. While security measures should be implemented to protect personal data, there is not as much of a critical need to design with risk in mind. This rules out Spiral. Additionally, there may be a need later on for different types of data visualization models as more users use the system. This cannot be anticipated by the Waterfall model and would make it more difficult to maintain the system throughout the lifespan of the software. This rules out Waterfall. This leaves us with Scrum and RUP to choose from. At a glance, RUP might be a better pick for this software since there is an entire phase dedicated to deploying and managing the software. However, I can personally attest to the fact that Scrum is perfectly capable of handling software maintenance after the project has been deployed because of its iterative and incremental nature. Additionally, you would not need to rely on proprietary tools to handle RUP development.

3. Embedded software

Application: TI-84 Graphing Calculator

URL: <https://tinyurl.com/yzajj56e>

Features: Load and execute various pre-installed apps, perform arithmetic operations, render graphs, handle button inputs, etc.

Development Model: Waterfall

Development Model Justification: Because the TI-84 Graphing Calculator is essentially an all-in-one computer, careful planning must be made in designing the physical hardware of the machine along with the firmware that provides the basic functionality of the machine. Once everything is built, it would be difficult to continuously maintain the system. While it may be possible for the firmware to be updated through a link cable between the calculator and a computer connected to the internet, the low-level logic of button inputs cannot be fixed after shipping. Everything must be planned out, which is why Waterfall is the best model for this system.

Development Models

1. RUP
2. Waterfall
3. Scrum
4. Spiral

Activity 2: Requirements Process (12 points)

Requirements processes involve 4 major types of activities: *elicitation*, *analysis*, *validation*, and *management*. For each of the activities listed below, indicate whether that activity would happen in (E)licitation, (A)nalysis, (V)alidation, or (M)anagement. Choose only one and include a *brief* justification below the choice. To give you an idea of what we are looking for, the first few are done for you.

 A You create a UML model identifying class to represent architectural components.

High-level design modeling is an analysis activity. But even better here wouldn't be architectural components, but modeling the problem space.

 M You review modifications made to your requirements document by using the "Track Changes" feature in MS Word.

This is a simple form of managing change by tracking it (traceability)

 V You review your business analyst's requirements looking for inconsistencies.

A human review activity assessing one of the quality attributes we discussed on Monday

 E You conduct an offsite meeting with end users to flesh out a project homepage.

Elicitation is the process of drawing out requirements from customers and end users

 E You define an online survey to gather information about desired features your gaming app.

Gathering information is part of the Elicitation phase in Requirements Engineering, though other techniques would be included as well.

 V You prototype a gaming subroutine in order to understand how fast it can render on laptops.

Prototyping is a technique for Validation, which in this case can help check if the rendering time of the subroutine meets requirements.

 E You email the requirements document to stakeholders to ensure all requirements are captured.

Document analysis is a technique of Elicitation and can help ensure that all relevant requirements information is accounted for.

 A You conduct a brainstorming session with your developers to discuss how to implement a complex feature.

Brainstorming can help produce visuals that can translate requirements to system features. Since this complex feature might be described at a high level, a brainstorming session would produce a model of this feature.

 E You conduct a brainstorming session with end users to discuss what features are the highest priority.

Brainstorming in this case is intended to evaluate feature priorities, which falls under the speculative technique for Elicitation.

 E You prototype the project homepage to ensure you understand what the customer wants.

Because this prototyping is done to understand what the customer wants in terms of functionality, not to test it against requirements, this is an Elicitation example.

Activity 3: Inception (16 points)

The table below lists deliverables produced during Inception. Often deliverables are listed more than once to indicate what state that deliverable is in at a given point in time. Fill in the 3rd column with the most likely point in time given the state of the deliverable and explain your reasoning. Your choices are “Inception phase, 1st iteration”, “Inception phase, 2nd iteration”, “Elaboration phase”, or “not an RE task”. To give you a better idea, a few of them are done for you.

No.	Artifacts	State at milestone	When	Explanation
1	Vision	Project's core requirements, key features, and main constraints are documented.	<i>Inception, Iteration 1</i>	<i>Initially the Vision doc tries to capture the essence of the proposed system.</i>
2	Vision	Based on new information obtained during the phase, establishing a solid understanding of the most critical use cases that drive design and planning decisions.	<i>Inception, Iteration 2</i>	<i>The Vision document then tries to identify the key features (10-20% of the scenarios) that are most critical.</i>
3	Risk List	Initial project risks identified.	Inception, Iteration 2	Definitions of these risks will exist in a Risk List. Various templates exist for it. Listed in

				Objective 4.
4	Risk List	New risks tend to be around how the application support team will handle defect issues that come up post-rollout.	<i>Not an RE task</i>	<i>While some amount of deployment planning should start even in Inception, detailed issues like this won't worry the team until later.</i>
5	Analysis Model	May or may not be developed as a formal artifact; this starts to translate the problem into the solution space.	Not an RE task	There is no explicit mention of an analysis model in the slides. However, modelling of use cases will occur in Elaboration as requirements are elaborated upon.
6	Software Development Plan	Covers in detail how the Construction and Transition phases should proceed	<i>Elaboration</i>	<i>The SDP is completed at the end of Elaboration to guide the Construction and Transition phases.</i>
7	Iteration Plan	Iteration plan for 1st Elaboration iteration completed.	Not an RE task	There is no mention of an iteration plan in the slides.
8	Iteration Plan	Iteration plan for the 2 nd Inception iteration completed.	Not an RE task	There is no mention of an iteration plan in the slides.
9	Glossary	Complete list of business/domain-specific terms with complete definitions.	Inception, Iteration 1	Domain models and glossary can be created to begin representing around 20% of essential system scenarios.
10	Glossary	Important terms identified with informal definitions.	<i>Inception, Iteration 1</i>	<i>While not an explicit task, essential terms must be identified and expounded upon in 1-2 sentences.</i>
11	Use-Case Model	A use-case model (approximately 80% complete)—all use cases having been identified in the use-case catalog, all actors having been identified, and most use-case descriptions developed.	Elaboration	By 80% complete, I assume this means that 80% of use cases have been detailed. This will exclude use cases with little to no risk and volatile use cases.
12	Use-Case Model	Important actors and use cases identified and flows of events outlined for only the most critical (10-20%) use cases.	Inception, Iteration 1	This is listed in Objective 1 and emphasizes understanding the scope of the system.
13	Domain Model	Glossary plus additional models and knowledge describing the business domain.	Inception, Iteration 1	Domain models and glossary can be created to begin representing around 20% of essential system scenarios.
14	Prototype	An partly functional prototype created to explore the feasibility of applying solution X to problem Y.	Inception, Iteration 2	Listed in Objective 3 of Inception as the deliverable of determining a single potential solution for feasibility evaluation.
15	Prototype	One or more executable prototypes have been created to confirm user interface requirements.	Elaboration	One of the goals at the end of evaluation is to produce prototypes of visually oriented use cases. This would correspond with User Interface Requirements.
16	QA Plan	A document describing what quality-related activities will take place during the entire lifecycle	Not an RE task	There is no mention of a QA plan in the slides. However, architectural quality verification does take place in Elaboration in the form of Stress and Load tests.
17	Test Plan	A document describing what tests will be done and when	Not an RE task	There is no mention of a Test plan in the slides. However, architecture testing for major component interfaces occurs in Elaboration.
18	Test Scripts	Specific steps to executing a functional test	Not an RE task	There is no mention of Test Scripts in the slides. While testing occurs during development of major interfaces, more formal testing will likely happen in Construction.
19	Tool Plan	Plan describing what software tools and environments will be required by the team	Inception, Iteration 2	This falls under Objective 5 of Inception and asks for a Software Development Plan and a setup of initial environment and tools.
20	Business Case	Includes a feasibility analysis that basically says, “should we move forward with this project?”	Inception, Iteration 1	This falls under Objective 4 of Inception and helps us understand whether the project will

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| solve the problem the business needs solved.