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Capstone project-1 part-1: Online Agriculture Products Store

Case study:

Mr. Henry, after being successful as a businessman and has become one of the wealthiest persons in the city. Now, Mr. Henry wants to help others to fulfil their dreams. One day, Mr. Henry went to meet his childhood friends Peter, Kevin and Ben. They live in a remote village and do farming. Mr. Henry asked his friends if they are facing any difficulties in their day-to-day work.

Peter told Mr. Henry that he is facing difficulties in procuring fertilizers which are very important for farm. Kevin said that he is also facing the same problem in-case of buying seeds for farming certain crops. Ben raised his concern on lack of pesticides which could help in greatly reducing pests in crops.

After listening to all his friends' problems, Mr. Henry thought that this is a crucial problem faced not only by his friends but also by so many other farmers. So, Mr. Henry decided to make an online agriculture product store to facilitate remote area farmers to buy agriculture products. Through this Online Web / mobile Application, Farmers and Companies (Fertilizers, seeds and pesticides manufacturing Companies) can communicate directly with each other.
The main purpose to build this online store is to facilitate farmers to buy seeds, pesticides, and fertilizers from anywhere through internet connectivity. Since new users are involved, Application should be user friendly.
This new application should be able to accept the product (fertilizers, seeds, pesticides) details from the manufacturers and should be able to display them to the Farmers. Farmers will browse through these products and select the products what they need and request to buy them and deliver them to farmers location.
Mr. Henry has given this project through his Company SOONY. In SOONY Company, Mr Pandu is Financial Head and Mr Dooku is Project Coordinator. Mr. Henry, Mr Pandu , and Mr Dooku formed one Committee and gave this project to APT IT SOLUTIONS company for Budget 2 Crores INR and 18 months Duration under CSR initiative. Peter, Kevin and Ben are helping the Committee and can be considered as Stakeholders share requirements for the Project.

Mr Karthik is the Delivery Head in APT IT SOLUTIONS company, and he reached out to Mr Henry through his connects and bagged this project. APT IT SOLUTIONS company have Talent pool Available for this Project. Mr Vandanam is project Manager, Ms. Juhi is Senior Java Developer, Mr Teyson, Ms Lucie, Mr Tucker, Mr Bravo are Java Developers. Network Admin is Mr Mike and DB Admin is John. Mr Jason and Ms Alekya are the Tester. And you joined this team as a BA.

Question-1

Identify Business process Model for Online Agriculture store – (Goal, Inputs, Resources, Outputs, Activities, Value created to the end customers)

The **business process model** for an online agriculture store includes the essential elements needed to deliver a valuable, accessible, and efficient digital marketplace for agricultural products.

Goal

- To enable farmers, especially in remote areas, to **conveniently purchase seeds, fertilizers, and pesticides** directly from manufacturers using a user-friendly online platform (web/mobile), improving access, quality, and efficiency.

Inputs

- Product information: Listings of fertilizers, seeds, and pesticides with descriptions, pricing, availability, and manufacturer details.
- User data: Registration details of farmers and manufacturers.
- Order and payment details: Farmers' selections, quantities, delivery preferences, and payment info.

Resources

- Technology: Application software (web and mobile), secure payment gateways, inventory management systems, delivery/logistics network.
- Human: Project managers, developers, testers, admins, business analysts, support staff.
- Product inventory: Manufacturer-supplied seeds, fertilizers, pesticides.

Activities

- Registration/login of users (farmers and manufacturers).
- Manufacturers list/update products.
- Farmers browse/search products.
- Selection and ordering by farmers.
- Payment processing (multiple options).
- Order processing/confirmation.
- Product shipment and delivery tracking.
- Customer support and feedback collection.
- Marketing and promotional activities.

Outputs

- Successfully delivered agricultural products (orders fulfilled).
- Order confirmations and delivery notifications to farmers.
- Customer feedback and reviews on products and service.

Value Created for End Customers

- **Convenience**: Ability to buy needed farming inputs from anywhere, anytime.
- **Access**: Broader choice of products and direct manufacturer-farmer connection.
- **Efficiency and Transparency**: Real-time product info, order tracking, and secure payments.

- **Support**: Customer service for queries, complaints, and guidance.
- **Empowerment**: Reduces reliance on intermediaries, often lowers product costs, and helps farmers make more informed purchasing decisions.

By integrating these components, the business process model ensures the online agriculture store effectively addresses farmers' needs and enhances the agricultural value chain.

Question-2

Mr Karthik is doing SWOT analysis before he accepts this project. What Aspects he Should consider as Strengths, as Weaknesses, as Opportunity and as Threats.

Mr. Karthik's **SWOT analysis** before accepting the online agriculture product store project, these are the key aspects to consider in each category:

Strengths

- Ready access to a skilled and experienced IT team, including developers, testers, and admin staff.
- Online store enables wide product selection—seeds, fertilizers, and pesticides—catering to diverse farming needs.
- Platform increases convenience, allowing farmers to shop from anywhere, anytime.
- Ability to reach remote and underserved markets, broadening business reach.
- Cost efficiency compared to traditional stores (lower overheads, no need for physical space).
- Potential for scalable technology solutions.

Weaknesses

- Limited ability for customers to physically examine products, leading to quality concerns or hesitation.
- Possible technical issues—site downtime, bugs, payment failures—can disrupt user experience.
- Absence of face-to-face customer service may reduce personal connection.
- Logistics challenges: ensuring timely delivery, especially for remote or perishable solutions.
- Project constraints: Strict timelines (18 months) and potentially insufficient budget (2 Crore INR).
- Dependence on manufacturers and delivery partners for reliable order fulfilment.

Opportunities

- Expanding into untapped rural and urban markets and boosting agricultural commerce reach.
- Potential to add value services: Agri-consulting, education, new categories, or bundled products.
- Ability to partner with rural banks, local cooperatives, or Agri-influencers for rapid adoption.
- Leverage customer data for targeted marketing and personalized offerings.
- Rising adoption of digital technologies among Indian farmers.

Threats

- Intense competition from other agri-ecommerce solutions or established retail brands.
- Changing government regulations or agro-product policies affecting online sales.
- Digital illiteracy or resistance to technology among target users in remote areas.
- Data security, payment fraud, or privacy issues.
- Lack of robust infrastructure (internet, delivery logistics) in remote regions.

These points will help Mr. Karthik assess risks and make informed decisions on project acceptance and strategy.

Question-3

Mr Karthik is trying to do **feasibility study** on doing this project in Technology (Java), Please help him with points (HW SW Trained Resources Budget Time frame) to consider in feasibility Study.

The critical points Mr. Karthik should consider while conducting a feasibility study to implement the online agriculture store project using Java technology, focusing on hardware, software, trained resources, budget, and time frame:

Hardware (HW)

- Ensure sufficient server resources (CPU, RAM, disk space) for hosting the Java-based web and mobile application, based on expected user traffic and data load.
- Validate that end users (farmers and manufacturers) will be able to access the platform with typical smartphones, tablets, and PCs common in rural and semi-urban locations.
- Confirm network infrastructure for secure, continuous access during development, deployment, and ongoing support.

Software (SW)

- Select robust Java frameworks (such as Spring, Hibernate) and supporting tools that enable secure, scalable, and maintainable application development.
- Identify and prepare databases (e.g., MySQL or PostgreSQL), application servers (like Tomcat), version control, and automation tools for development and deployment.
- Ensure availability of required software licenses and compliance with open-source/reuse policies.

Trained Resources

- Assess availability of Java developers skilled in chosen frameworks and tools, as well as experienced UI/UX designers, QA testers, database admins, and network admins.
- Identify gaps in experience regarding large e-commerce or agriculture-specific platforms, and plan for upskilling or hiring if needed.
- Confirm the team's capacity to deliver additional features, provide ongoing support, and incorporate user feedback.

Budget

- Detail the overall project cost, including staff salaries, hardware procurement, software licenses, infrastructure (servers/cloud), and third-party integrations (such as payment gateways).
- Allocate funds for marketing, platform maintenance, and unexpected issues or scope changes.
- Make sure the total budget aligns with the available allocation (in this case, within 2 Crore INR).

Time Frame

- Create a project plan with milestones for requirements gathering, design, development, testing, deployment, user onboarding, and training.
- Incorporate time for system integration, addressing bugs, user feedback, and feature iterations as needed.
- Confirm that all major deliverables can be realistically achieved within the allowed 18-month timeline, with contingency built in for potential delays.

By addressing these points, Mr. Karthik ensures all technical, human, financial, and scheduling aspects are considered, reducing risks and increasing the likelihood of project success.

Question-4

Mr Karthik must submit **Gap Analysis** to Mr Henry to convince to initiate this project. What points (compare AS-IS existing process with TO-BE future Process) to showcase in the GAP Analysis

Mr. Karthik's Gap Analysis, the comparison between the AS-IS (existing process) and TO-BE (future, post-project) process should be clearly illustrated to highlight areas where the online agriculture store will transform and improve operations. Here are the key points to showcase:

Product Access

AS-IS:

- Farmers in remote areas struggle to find reliable sources for fertilizers, seeds, and pesticides.
- Buying options are limited by geography, leading to fewer choices and potential quality concerns.

TO-BE:

- Farmers can browse a wide variety of products online from multiple manufacturers, ensuring easier and better access regardless of location.
- Product quality, pricing, and availability can be compared instantly.

Purchase Convenience

AS-IS:

- Farmers must travel to towns, facing time, travel, or weather constraints.
- Procurement often involves middlemen, which may raise costs.

TO-BE:

- Purchases can be made directly via web or mobile from farms or homes, saving time and effort.
- Direct interaction between manufacturers and farmers reduces dependency on intermediaries, potentially lowering costs.

Transaction & Payment

AS-IS:

- Often cash-based, untracked, or credit-dependent transactions.
- Limited payment flexibility.

TO-BE:

- Multiple secure digital payment methods and order tracking available.
- Improved transaction transparency and easy record-keeping.

Information & Support

AS-IS:

- Information about agri-products is sparse, with no clear channel for clarification or support.
- Difficulty in seeking help with product-related issues or after-sale service.

TO-BE:

- Comprehensive product details, manufacturer support, and user reviews provided online.
- Customer service and digital support channels allow timely assistance.

Supply Chain, Delivery, and Logistics

AS-IS:

- No streamlined delivery; farmers handle transport, storage, and logistics challenges personally.
- Delayed or unpredictable supply, risk of stock-outs.

TO-BE:

- End-to-end digital order processing and tracked delivery service to the farmer's location.
- Streamlined logistics ensures timely supply and reduces uncertainty.

Market Reach and Transparency

AS-IS:

- Manufacturers and farmers have limited reach and market intelligence.
- Opaque pricing and limited competition hinder better deals.

TO-BE:

- Wider market access for both farmers and suppliers, fostering competition and transparency.
- Real-time data on pricing, stock, and market trends available to inform buyer decisions.

Emphasizing these points in the Gap Analysis will convincingly demonstrate the substantial improvements and value the online agriculture product store brings compared to the traditional setup.

Question-5

In the Risk Analysis for the online agriculture product store project, both Business Analyst (BA) risks and process/project-related risks must be considered. Here are key risk factors across these categories:

Business Analyst (BA) Risks

- **Inadequate Requirement Gathering:** Missing or unclear requirements due to incomplete stakeholder engagement, especially with farmers unfamiliar with technology.

  Example-If Mr. Karthik misses asking farmers about their preferred payment methods, the app might only support digital payments, causing many farmers, who rely on cash, to struggle.

- **Miscommunication:** Misinterpretation of stakeholders' needs between farmers, manufacturers, and project team.

  Example-Suppose manufacturers want a complex product upload interface, but the BA understands it as simple. Developers build a basic interface, frustrating manufacturers and causing rework.

- **Scope Creep:** Uncontrolled changes or additions to project requirements leading to delays or budget overruns.

  Example-Midway through development, stakeholders demand adding live chat support, which wasn't originally planned. This delays the project and increases costs.

- **Stakeholder Availability:** Limited availability or engagement of critical stakeholders like farmers or manufacturers during requirement validation.

  Example-Farmers busy with harvesting season might not attend requirement meetings, leading to assumptions that don't match real needs.

- **Understanding Domain:** Insufficient BA knowledge about agriculture industry specifics, products (seeds, fertilizers, pesticides) and farmer need.

  Example-If the BA doesn't understand different fertilizer types, important nuances like usage seasons may be missed, impacting product listings

- **Documentation Gaps:** Poorly maintained or outdated requirement documents causing confusion for development and testing teams.

  Example-If user stories or requirements are unclear or outdated, developers might build wrong features, e.g., listing products without price info.

Process / Project Risks

- **Technical Risks:** Challenges in developing a scalable, user-friendly application that supports multiple product types and handles peak loads.

  Example-The app crashes when many farmers try to order simultaneously during sowing season because it wasn't designed to handle high traffic.

- **Integration Issues:** Difficulties integrating manufacturer systems, payment gateways, and logistics partners.

  Example-Payment gateway fails to connect properly, resulting in failed transactions and frustrated users.

- **Infrastructure Risks:** Poor internet connectivity and device incompatibility in remote farmer locations.

  Example-Farmers living in remote villages have slow or no internet; the app's heavy graphics don't load, making it unusable for them.

- **Data Security Risks:** Threats related to data privacy, payment fraud, or cyber-attacks affecting user trust.

  Example- A hacking attempt exposes farmers' personal and payment data, damaging trust and legal compliance.

- **Logistics & Delivery Risks:** Delayed, lost, or damaged shipments due to remote areas or inefficient logistics.

  Example-During monsoon season, deliveries get delayed or lost on muddy roads, leading to customer complaints and order cancellations.

- **User Adoption Risks:** Low adoption or resistance by farmers unfamiliar with digital platforms.

  Example-Older farmers reluctant to use smartphones avoid the app, preferring traditional buying methods, limiting platform reach.

- **Budget Overruns:** Costs exceeding the allocated 2 Crore INR due to underestimated effort or unforeseen expenses.

  Example-Unexpected costs arise to upgrade servers and databases as user numbers grow fast, exceeding the 2 Crore INR budget.

- **Timeline Delays:** Failure to meet 18-month deadline due to complexity, resource availability, or requirement changes.

  Example-Key developers fall ill or leave the company, causing delays in feature completion and pushing back the 18-month deadline.

- **Quality Risks:** Defects or usability issues causing dissatisfaction or impacting order processing.

  Example-Bugs in order processing cause duplicate orders or incorrect product shipments, resulting in customer dissatisfaction.

- **Regulatory Compliance:** Changes in agricultural or e-commerce regulations impacting operations or product approval.

  Example-New government rules require additional certifications for pesticide sales online, delaying product listings until compliance is ensured.Careful identification, monitoring, and mitigation strategies for these risks will be essential for project success.

Question-6

Perform **stakeholder analysis (RACI Matrix)** to find out the key stakeholders who can take decisions and Who are the influencers

Here is a Stakeholder Analysis with a RACI Matrix for the online agriculture product store project, identifying key stakeholders who take decisions and those who influence decisions.

Activity / Role	**Mr. Henry (Sponsor)**	**Mr. Pandu (Finance Head)**	**Mr. Dooku (Project Coordinator)**	**Mr. Karthik (Delivery Head)**	**Mr. Vandanam (Project Manager)**	**Development Team (Juhi, Teyson, Lucie, Tucker, Bravo)**	**Network & DB Admin (John)**
Project funding approval	Accountable (A)	Consulted (C)	Consulted (C)	Informed (I)	Informed (I)	Informed (I)	Informed (I)
Requirement gathering	Informed (I)	Informed (I)	Consulted (C)	Consulted (C)	Accountable (A)	Consulted (C)	Informed (I)
Budget planning and monitoring	Informed (I)	Accountable (A)	Consulted (C)	Informed (I)	Consulted (C)	Informed (I)	Informed (I)
Project coordination and progress monitoring	Informed (I)	Informed (I)	Accountable (A)	Responsible (R)	Responsible (R)	Informed (I)	Informed (I)
System design and development	Informed (I)	Informed (I)	Informed (I)	Responsible (R)	Accountable (A)	Responsible (R)	Consulted (C)
Testing and quality assurance	Informed (I)	Informed (I)	Informed (I)	Informed (I)	Consulted (C)	Consulted (C)	Consulted (C)
Deployment and delivery	Informed (I)	Informed (I)	Consulted (C)	Accountable (A)	Responsible (R)	Consulted (C)	Responsible (R)

Activity / Role	Mr. Henry (Sponsor)	Mr. Pandu (Finance Head)	Mr. Dooku (Project Coordinator)	Mr. Karthik (Delivery Head)	Mr. Vandanam (Project Manager)	Development Team (Juhi, Teyson, Lucie, Tucker, Bravo)	Network & DB Admin (John)
User training and support	Informed (I)	Informed (I)	Consulted (C)	Responsible (R)	Consulted (C)	Consulted (C)	Informed (I)

Key Decision Makers (Accountable)

- Mr. Henry (Sponsor/funding approval)
- Mr. Pandu (Finance and budget approval)
- Mr. Dooku (Project coordination)
- Mr. Karthik (Delivery and deployment)
- Mr. Vandanam (Project management & system development)

Influencers

- Farmers (Peter, Kevin, Ben) – Provide critical requirements and feedback
- Manufacturers – Product providers influencing system catalog and supply chain
- Business Analyst (You) – Key in gathering requirements, communicating between teams
- Development, Testing, Network, DB Admin Teams – Influence technical feasibility and quality

This RACI matrix clarifies roles, responsibilities, and decision-making authority, helping align project stakeholders for smooth execution.

Question-7

Help Mr Karthik to prepare a **business case document**

Business Case Document: Online Agriculture Product Store

1. Executive Summary

- Brief overview of the project purpose: To build an online platform enabling remote farmers to buy seeds, fertilizers, and pesticides directly from manufacturers.
- Expected benefits: Improved accessibility, reduced costs, enhanced farmer empowerment.
- Budget: 2 Crore INR

- Timeline: 18 months
- Sponsor: Mr. Henry (SOONY Company)
- Implementation Partner: APT IT SOLUTIONS

2. Business Problem / Opportunity

- Farmers in remote villages face difficulty procuring key agriculture inputs.
- Lack of a direct, reliable, and accessible marketplace limits productivity and growth.
- Opportunity to digitize agricultural supply chain, benefiting farmers and manufacturers alike.

3. Project Objectives

- Develop a user-friendly web and mobile application for farmers and manufacturers.
- Enable manufacturers to list and manage product offerings.
- Facilitate farmers to browse, order, and receive agricultural products at their location.
- Ensure secure transactions and timely delivery.
- Support and promote digital adoption among rural users.

4. Options Considered

- Status quo: Traditional supply chain with intermediaries. (Rejected due to inefficiency)
- Physical expansion of stores: High cost and limited reach. (Rejected)
- Online platform: Scalable, convenient, and efficient. (Selected)

5. Benefits

- Enhanced farmer access to quality inputs.
- Reduced dependency on middlemen, potentially lowering costs.
- Empowerment through transparency and choice.
- Strengthening manufacturer-farmer relationships.
- Contribution to rural economic growth and food security.

6. Costs & Resources

- Development cost: Includes design, coding, testing, deployment.
- Hardware and infrastructure expenses.
- Staff salaries (project managers, developers, testers, support).
- Marketing and outreach to onboard users.
- Contingency budget.

7. Risks & Mitigation

- Risk: Low digital literacy — Mitigation: User-friendly design, training, and support.
- Risk: Logistics challenges — Mitigation: Partner with reliable delivery networks.

- Risk: Budget overruns — Mitigation: Strict project monitoring and agile adjustments.
- Risk: Delays in development — Mitigation: Clear milestones and resource allocation.

8. Timeline & Milestones

- Requirements gathering and analysis (Month 1-3)
- System design (Month 4-5)
- Development phases (Month 6-14)
- Testing and quality assurance (Month 12-16)
- Deployment and user onboarding (Month 16-18)

9. Governance & Stakeholders

- Project Sponsor: Mr. Henry
- Financial oversight: Mr. Pandu
- Project Coordinator: Mr. Dooku
- Delivery Head: Mr. Karthik
- Project Manager: Mr. Vandanam
- Business Analyst: You
- Core development, testing, network, and database teams
- Key stakeholders: Farmers and manufacturers (feedback providers)

10. Recommendation

- Proceed with the online agriculture product store development under the V model methodology to ensure quality.
- Engage users early and iterate improvements to meet real needs.
- Leverage APT IT SOLUTIONS' talent pool for delivery within stipulated budget and timeline.

This document will help Mr. Karthik and the Committee clearly communicate the project's value, justify investment, and align stakeholders towards a successful launch.

Question-8

The Committee of Mr. Henry , Mr Pandu , and Mr Dooku and Mr Karthik are having discussion on Project Development Approach.

Mr Karthik explained to Mr. Henry about SDLC. And four methodologies like Sequential, Iterative, Evolutionary and Agile. Please share your thoughts and clarity on Methodologies

1. Sequential (Waterfall) Methodology

- Development phases follow a strict linear order: requirements → design → implementation → testing → deployment → maintenance.
- Each phase is completed before moving to the next, with little room for going back.
- Best suited for projects with well-defined, stable requirements.
- Advantage: Clear structure, easy to manage and document.
- Limitation: Inflexible to changes; issues found late can be costly to fix.
- Example: Building a traditional brick-and-mortar fertilizer store where first the location is finalized, designs are drawn, construction is completed, then stocking and finally opening the store. Changes or redesigns are costly once a phase is finished.
- When used: When the project requirements are clear upfront and unlikely to change, such as regulatory compliance software.

2. Iterative Methodology

- Development happens in repeated cycles (iterations), with each cycle producing a partial version of the product.
- Feedback from each iteration is used to refine and improve future cycles.
- Suitable when requirements are expected to evolve and early partial delivery is needed.
- Advantage: Early detection of issues and continuous improvement.
- Limitation: Requires good project management to handle evolving requirements.
- Example: Building a traditional brick-and-mortar fertilizer store where first the location is finalized, designs are drawn, construction is completed, then stocking and finally opening the store. Changes or redesigns are costly once a phase is finished.
- When used: When the project requirements are clear upfront and unlikely to change, such as regulatory compliance software.

3. Evolutionary Methodology

- A form of iterative development focused on building a working system early and evolving it through user feedback.
- Emphasis on prototyping and gradual development of full functionality.
- Useful when requirements are vague or rapidly changing.

- Advantage: Flexible and adaptive to new requirements or market changes.
- Limitation: Risk of scope creep and unclear final deliverables without strict control.
- Example: Building a traditional brick-and-mortar fertilizer store where first the location is finalized, designs are drawn, construction is completed, then stocking and finally opening the store. Changes or redesigns are costly once a phase is finished.
- When used: When the project requirements are clear upfront and unlikely to change, such as regulatory compliance software.

4. Agile Methodology

- An adaptive, iterative approach emphasizing collaboration, customer involvement, and fast delivery in short cycles called sprints.
- Prioritizes responding to change over following a fixed plan.
- Suitable for dynamic projects requiring frequent feedback and evolving requirements.
- Advantage: Highly flexible, promotes continuous delivery and improvement.
- Limitation: Can be less predictable in timelines and requires active stakeholder engagement.
- Example: Building a traditional brick-and-mortar fertilizer store where first the location is finalized, designs are drawn, construction is completed, then stocking and finally opening the store. Changes or redesigns are costly once a phase is finished.
- When used: When the project requirements are clear upfront and unlikely to change, such as regulatory compliance software.

Summary Thought for the Committee:

- **Sequential (Waterfall)** is best when requirements are clear and unlikely to change.
- **Iterative and Evolutionary** models offer more flexibility by building the system in phases and refining through feedback.
- **Agile** takes flexibility further, focusing on collaboration and delivering value incrementally with frequent reassessment.

For Mr. Henry's agriculture product store project, which involves new users, dynamic requirements, and evolving technology, **Iterative or Agile** methodologies are often preferred as they better accommodate changes and user feedback, ensuring a user-friendly and relevant final product. However, the choice depends on the team's capability, project scale, and stakeholder involvement.

Mr. Karthik should guide the committee to align the project approach with these considerations to maximize success.

Question-9

They discussed models in SDLC like waterfall RUP Spiral and Scrum . You put forth your understanding on these models

When the APT IT SOLUTIONS company got the project to make this online agriculture product store, there is a difference of opinion between a couple of SMEs and the project team regarding which methodology would be more suitable for this project. SMEs are stressing on using the V model and the project team is leaning more onto the side of waterfall model. As a business analyst, which methodology do you think would be better for this project?

Here is a simple and clear explanation of the four SDLC models—Waterfall, RUP, Spiral, and Scrum—that were discussed in the meeting:

1. Waterfall Model

- **What it is:** A step-by-step process where work is done in a fixed order like planning, designing, coding, testing, and then launching.
- **Simple example:** Like building a house where you first finish the foundation, then walls, roof, interiors, and finally move in. You cannot go back easily to change something.
- **When it works:** Best for projects where everything is clear from the start and unlikely to change.

2. Rational Unified Process (RUP)

- **What it is:** A step-by-step but flexible approach divided into four main parts: planning, designing, building, and launching, often repeating these in small cycles. It focuses on managing risks and well-documented steps.
- **Simple example:** Like planning a new farm where you first plan the layout (Inception), then work on soil preparation and irrigation (Elaboration), then plant crops (Construction), and finally harvest and sell (Transition), repeating improvements each season.
- **When it works:** For projects needing both structure and flexibility with clear goals.

3. Spiral Model

- **What it is:** A method where you build a small working part of the project first, test it, look for risks, gather feedback, then repeat with improved versions until done.
- **Simple example:** Testing a new tractor prototype with farmers, improving features with each trial before producing the final machine.
- **When it works:** For complex projects with uncertain needs that involve risks early on.

4. Scrum Model

- **What it is:** An Agile way to work where the team builds small parts of the software in short bursts (called sprints), gets feedback fast, and keeps improving.
- **Simple example:** Weekly markets where farmers bring small batches of new crops to sell, listen to customer responses, and adjust their products every week.

- **When it works:** For projects where needs change often and ongoing user feedback is important

Summary for the Committee

- Waterfall is simple but rigid, good for clear-cut projects.
- RUP gives a balance of planning and flexibility through phases.
- Spiral helps reduce risks with trial versions and feedback.
- Scrum is fast, flexible, and great for continuous improvements.

For Mr. Henry's project, which involves many new users and changing requirements, **Spiral or Scrum** would help build a usable product quickly and improve it based on real farmer feedback.This approach aligns the project with real needs while managing risks sensibly.

As a Business Analyst evaluating the V model versus the Waterfall model for the online agriculture product store project, here is a reasoned perspective:

Waterfall Model

- Linear, sequential approach with distinct phases like requirements, design, development, testing, deployment.
- Suitable for projects with **well-defined, stable requirements**.
- Emphasizes completing one phase fully before moving to the next.
- Testing happens after the development phase.

V Model

- Also called Verification and Validation model; an extension of Waterfall.
- Each development phase has a corresponding testing phase planned upfront (e.g., requirements mapping to acceptance testing).
- Strong focus on validation and verification activities throughout the lifecycle.
- Suitable for projects where **quality and compliance are critical** and requirements are well-understood.

Which is better for this project?

The agriculture product store serves a diverse user group (farmers, manufacturers), with **some uncertainty in detailed requirements and usability needs**, since many users are new to such technology.

The project also has **strict timeline and budget constraints** but requires a user-friendly, reliable system that supports product browsing, ordering, and secure payments.

The Waterfall model is simpler and easier for the team to follow but has **less emphasis on early and continuous testing**, which can risk late discovery of defects.

The V model adds rigor with planned testing phases aligned to development, improving **quality assurance** but can be more heavyweight in documentation and process.

Recommendation as BA:

- Since **requirements might evolve based on farmer/manufacturer feedback and usability considerations**, a rigid Waterfall or V model might struggle to accommodate changes.
- Between the two, the **V model offers better quality focus**, which is important for an e-commerce platform dealing with sensitive data and transactions.
- However, considering the user diversity and probable changes, it may be better to adopt an **Iterative or Agile-based approach** or a **hybrid model** combining waterfall discipline with incremental delivery and testing.
- If forced to choose between V and Waterfall only, the **V model is preferred for its testing rigor**, ensuring the platform reliability expected by farmers and manufacturers.

Conclusion

For this project, to balance quality, risk, and evolving user needs, the **V model** is better than pure Waterfall, though flexibility could be more if iterative or agile elements are incorporated.

As a Business Analyst, propose this approach to the Committee to mitigate risks related to quality and usability for this crucial farmer-focused ecosystem.

Question-10

Write down the differences between **waterfall model and V model.**

Aspect	Waterfall Model	V-Model
Development Flow	Sequential, linear phases completing one after another.	Sequential but with corresponding testing phases running in parallel to development phases.
Testing Timing	Testing starts after the entire development phase is completed.	Testing is planned early and happens alongside each corresponding development phase.
Flexibility	Rigid structure, difficult to accommodate changes once a phase is completed.	Slightly more flexible with early testing but still quite strict.
Error / Defect Detection	Defects are detected late, during the testing phase after development.	Defects are detected early during the respective testing phases aligned to development.
Risk Management	Higher risk as errors found late can cause costly rework and delays.	Lower risk due to early verification and validation activities.
User Involvement	Limited mainly during the requirements phase.	More involvement as validation occurs at multiple stages with early feedback.

Aspect	Waterfall Model	V-Model
Documentation	Heavy documentation mostly upfront and during phases.	Similar documentation but includes test plans aligned to each phase.
Debugging	Done mostly after testing phase, at the end of development.	Debugging can occur throughout development and testing phases.
Cost	Relatively low cost in terms of process overhead.	Generally more expensive due to increased testing and quality assurance activities.
Success Guarantee	Lower due to late testing and possible missed errors.	Higher because of rigorous testing and quality checks at every stage.
Suitability	Best for simple, well-defined, and stable projects.	Best for complex and safety-critical projects with high quality requirements.

Summary:

- The Waterfall model is a straightforward, step-by-step process suitable when requirements are clear and unlikely to change.
- The V-model builds on Waterfall by integrating validation and verification early alongside development, leading to better quality and early defect detection.
- For the agriculture product store project, where quality and usability are critical, and issues must be caught early, the **V-model** is generally the better choice. However, it comes with higher process costs and requires more effort in planning and testing.

This comparison aids in understanding the practical and quality differences between these two traditional SDLC models.

Question-11

As a BA, state your reason for choosing one model for this project

As a Business Analyst, I recommend choosing the **V-Model** for the online agriculture product store project for the following reasons, illustrated with case study examples:

- **Quality Assurance:** Since the platform will handle sensitive transactions like payments and manage critical product information (fertilizers, seeds, pesticides), quality is paramount. The V-Model ensures testing phases are planned alongside development, so issues like payment gateway failures or incorrect product listing can be caught early before launch, preventing farmer dissatisfaction.
- **Risk Reduction:** Early detection of defects is vital. For example, if the app crashes when many farmers try to order during the sowing season, finding and fixing this early avoids costly delays or reputation damage. The V-Model's early and continuous verification helps mitigate such risks.
- **Structured Approach:** The project involves multiple stakeholders—Mr. Henry, Mr. Pandu, Mr. Dooku, Mr. Karthik, farmers, and manufacturers—requiring clear milestones and validation at every stage. The V-Model's disciplined phases with corresponding testing provide visibility and control, ensuring each requirement from Peter, Kevin, and Ben is met accurately.

- **User-Centric Validation:** Farmers in remote areas have limited digital experience, making usability critical. The V-Model emphasizes validation of requirements through planned user-acceptance tests, ensuring the interface is user-friendly and meets farmers' needs before full rollout.
- **Documentation and Traceability:** Extensive documentation under the V-Model helps keep track of requirements and their validation. For example, clear records of product specifications from manufacturers and their corresponding tests ensure reliable product listings and reduce errors.

In summary, the V-Model's focus on **early testing, risk management, structured process, and user validation** aligns perfectly with the project's complexity, quality needs, and diverse stakeholder expectations, ensuring a reliable, usable, and trusted online agriculture platform for farmers and manufacturers.

Question-12

The Committee of Mr. Henry, Mr Pandu, and Mr Dooku discussed with Mr Karthik and finalised on the V Model approach (RG, RA, Design, D1, T1, D2, T2, D3, T3, D4, T4 and UAT)

Mr Vandanam is mapped as a PM to this project. He studies this Project and Prepares a Gantt chart with V Model (RG, RA, Design, D1, T1, D2, T2, D3, T3, D4, T4 and UAT) as development process and the Resources are PM, BA, Java Developers, testers, DB Admin, NW Admin.

Given the project adoption of the V-Model approach with phases: Requirement Gathering (RG), Requirement Analysis (RA), Design, and pairs of Development (D1, D2, D3, D4) and corresponding Testing (T1, T2, T3, T4), plus User Acceptance Testing (UAT), and resource mapping, Mr. Vandanam as Project Manager will prepare a Gantt chart incorporating these elements.

Key Elements for the Gantt Chart:

Phase	Description	Resources Involved
RG (Requirement Gathering)	Collect detailed requirements from farmers, manufacturers, and stakeholders	PM, BA
RA (Requirement Analysis)	Analyze and document requirements, ensure clarity and feasibility	PM, BA
Design	System architecture, UI/UX design, database design	PM, BA, Java Developers
D1 (Development 1)	Develop core modules (e.g., user registration, product catalog)	Java Developers
T1 (Testing 1)	Test core modules functionality and integration	Testers
D2 (Development 2)	Develop order processing and payment modules	Java Developers

Phase	Description	Resources Involved
T2 (Testing 2)	Test order/payment-related functions	Testers
D3 (Development 3)	Develop delivery tracking and communication modules	Java Developers
T3 (Testing 3)	Test delivery tracking and notification systems	Testers
D4 (Development 4)	Final development including reporting and admin features	Java Developers
T4 (Testing 4)	Final testing including system integration and regression testing	Testers, DB Admin, NW Admin
UAT (User Acceptance Testing)	Real users (farmers/manufacturers) validate the complete system	PM, BA, Testers, End Users (Farmers, Manufacturers)

Resource Roles:

- **PM (Project Manager):** Oversees project progress, resource allocation, milestone tracking, stakeholder communication.
- **BA (Business Analyst):** Gathers and validates requirements, supports testing and UAT.
- **Java Developers:** Write code for different modules per the design specifications.
- **Testers:** Execute planned tests per each development phase.
- **DB Admin:** Manages databases, supports testing of data integrity and performance.
- **Network Admin:** Oversees network infrastructure, ensures system accessibility during testing and deployment.

Gantt Chart Considerations

- Phases are sequential but overlap of Design and Development can exist with early preparation.
- Testing phases (T1, T2, T3, T4) start immediately after their corresponding development phases.
- Adequate buffer time for reviews and rework after each testing phase.
- UAT is scheduled toward the end but allows for feedback iterations if necessary.
- Resource availability and load balancing to avoid bottlenecks.

Mr. Vandanam will map these activities with estimated durations (e.g., RG and RA taking 1-2 months, development sprints 2-3 months each, testing 1-2 months per phase) and dependencies in the project plan to ensure timely delivery within the 18-month timeline. This Gantt will provide a clear timeline and responsibility matrix for tracking project progress aligned with the V-Model lifecycle.

Question-13

Explain the difference between **Fixed Bid and Billing projects**

Aspect	Fixed Bid Project	Billing (Time and Materials) Project
Pricing Model	A fixed, agreed-upon total cost for the entire project, set up front.	Client is billed based on actual hours worked and materials used.
Scope	Well-defined, stable, and unlikely to change during the project.	Flexible, evolving scope that can change as project progresses.
Budget Certainty	High certainty, as cost is fixed in contract.	Budget is variable and depends on project duration and effort.
Timeline	Fixed deadlines, with project completion at agreed milestones.	Timeline can be flexible; duration may adjust with scope changes.
Client Involvement	Usually limited after initial requirements are set.	Active client involvement required for feedback and scope adjustments.
Risk Allocation	Vendor bears the risk if project overruns cost or time.	Client bears the risk of cost overruns due to changing requirements.
Best Suited For	Small to medium projects with clear, fixed requirements.	Large or complex projects where requirements are uncertain or expected to evolve.
Advantages	Predictable cost and schedule; easier budgeting.	Flexibility to adapt to changing needs; better for innovation and iterative development.
Disadvantages	Inflexible to changes; change requests can be expensive.	Less predictable cost and schedule; requires tight monitoring.

Example related to the agriculture product store project:

Fixed Bid: If the Committee clearly defines all features upfront (e.g., product browsing, order placement, payment integration) with no expected changes, a fixed bid lets them know the total cost is capped at 2 Crore INR. This provides budgeting certainty but risks less flexibility if farmers or manufacturers request changes.

Billing (Time & Materials): If requirements are evolving due to ongoing farmer feedback, or new features like delivery tracking might be added late, a time and materials billing lets APT IT SOLUTIONS adapt and bill for actual work done. This offers flexibility but requires close budget tracking by the Committee.

Conclusion:

- Choose **Fixed Bid** when project scope is clear, budget must be controlled tightly, and changes are minimal.

- Choose **Billing (Time and Materials)** when flexibility is critical, and requirements may evolve during development.

For the online agriculture product store with some unknowns and new users, a mixed or time & materials approach may offer better adaptability, whereas fixed bid suits well-defined, smaller modules or phases of the project.

Billing (Time & Materials) projects are best chosen over Fixed Bid projects in the following situations:

1. **Unclear or Evolving Requirements:**
   When the project scope and requirements are not well understood at the start or are expected to change frequently during development. For example, if new features or changes will likely emerge from farmer feedback in the agriculture product store, Time & Materials (T&M) allows flexibility to accommodate those changes.
2. **Longer or Complex Projects:**
   For large-scale projects or those expected to take significant time, where estimating exact cost or time upfront is difficult. T&M lets the team adjust work as the project progresses without rigid constraints.
3. **Iterative and Experimental Work:**
   When the project follows an iterative approach, where work happens in stages and features evolve based on continuous testing and learning. The agriculture store app may need iterative refinements based on user adoption.
4. **Need for Flexibility in Scope and Budget:**
   If clients want the freedom to add, remove, or modify features anytime during the project to respond to changing market needs or priorities, T&M provides this agility without renegotiating contracts.
5. **New or Innovative Projects:**
   When the service provider or client is entering a new domain or is unsure of the technical challenges ahead, T&M reduces risk by billing based on actual effort rather than fixed estimates.

Summary:

- **Choose Time & Materials when:** Requirements are uncertain or likely to evolve, project is long or complex, and flexibility is critical.
- **Choose Fixed Bid when:** Requirements are clearly defined, small in scope, and unlikely to change, enabling predictable costs and schedules.

For Mr. Henry's online agriculture product store, where farmer needs and technological adoption may evolve, Billing (Time & Materials) would allow adaptation and iterative improvements, increasing the chance of delivering a user-friendly, relevant platform.

Question-14 Prepare Timesheets of a BA in various stages of SDLC - 20 marks

- Design Timesheet of a BA
- Development Timesheet of a BA
- Testing Timesheet of a BA
- UAT Timesheet of a BA
- Deployment n Implementation Timesheet of a BA

Design Stage Timesheet of a Business Analyst:

Date	Task/Activity	Description	Hours Spent	Comments
Day 1	Review Requirements	Analyze gathered requirements for completeness	3	Identify gaps and clarifications
Day 2	Stakeholder Workshops	Conduct workshops with farmers, manufacturers	4	Elicit detailed design inputs
Day 3	Create Use Cases / User Stories	Document use cases or user stories for design phase	5	Starting user-centric scenarios
Day 4	Process Modeling	Develop process flow diagrams for online store modules	4	Visualize workflows
Day 5	Prepare Functional Specification	Draft functional requirements for designers & developers	6	Basis for UI/UX and system design
Day 6	Review Design Documents with Team	Collaborate with PM, developers, and testers	3	Clarify ambiguities & ensure alignment
Day 7	Update Documentation	Incorporate feedback and finalize design docs	2	Prepare for development handoff

Total Estimated Hours: 27 hours (for one week)

Development Stage Timesheet of a Business Analyst:

Date	Task/Activity	Description	Hours Spent	Comments
Day 1	Requirement Clarifications	Address developer queries on requirements	2	Ensure correct interpretation
Day 2	Support Development Team	Attend daily stand-ups or sprint planning	3	Provide timely clarifications
Day 3	Review Development Progress	Assess progress against requirements	3	Identify risks or deviations
Day 4	Update Requirement Documents	Reflect any changes or new requirements post-feedback	3	Keep documentation current
Day 5	Prepare Test Scenarios / Cases	Collaborate with testers to draft test cases	4	Ensure coverage of all requirements

Date	Task/Activity	Description	Hours Spent	Comments
Day 6	Conduct Gap Analysis	Identify gaps between expected and actual development	3	Early detection of discrepancies
Day 7	Stakeholder Communication	Update stakeholders on development and gather feedback	2	Maintain engagement

Total Estimated Hours: 20 hours (for one week)

Testing Stage Timesheet of a Business Analyst:

Date	Task/Activity	Description	Hours Spent	Comments
Day 1	Review Test Cases	Verify test cases cover all functional requirements	3	Ensure accuracy and completeness
Day 2	Clarify Requirements to Testers	Support testers by answering questions on requirements	3	Provide clarifications
Day 3	Participate in Defect Triage Meetings	Help prioritize and explain defects found during testing	2	Collaborate with PM and developers
Day 4	Validate Fixes and Retesting	Verify defects are fixed by reviewing retests	3	Confirm resolution meets requirements
Day 5	Document Testing Issues	Log and document issues or gaps identified	2	Maintain clear defect records
Day 6	Support Regression Testing	Assist in defining areas to be retested after fixes	3	Ensure overall stability

Total Estimated Hours (1 week): 16 hours

User Acceptance Testing (UAT) Timesheet of a Business Analyst:

Date	Task/Activity	Description	Hours Spent	Comments
Day 1	Plan UAT Activities	Define test scenarios aligned with user requirements	4	Prepare UAT documentation

Date	Task/Activity	Description	Hours Spent	Comments
Day 2	Coordinate with Farmers & Manufacturers	Arrange schedules and communicate UAT instructions	3	Manage user participation
Day 3	Facilitate UAT Sessions	Guide users through testing processes	5	Provide support and gather feedback
Day 4	Collect and Document Feedback	Compile issues, suggestions, and approval status	3	Prepare reports for the project team
Day 5	Support UAT Issue Resolution	Work with developers to address critical issues	3	Verify fixes and communicate updates

Total Hours (UAT Stage - 1 week): 18 hours

Deployment and Implementation Timesheet of a Business Analyst:

Date	Task/Activity	Description	Hours Spent	Comments
Day 1	Deployment Planning	Coordinate deployment activities with PM and Dev	3	Finalize deployment checklist
Day 2	User Training Preparation	Develop training materials and documentation	4	Prepare guides for farmers and staff
Day 3	Conduct User Training Sessions	Train end users (farmers/manufacturers)	5	Facilitate understanding of the system
Day 4	Post-Deployment Support	Monitor system and assist with early issues	3	Provide quick resolution support
Day 5	Collect Post-Implementation Feedback	Gather feedback on system performance and adoption	3	Prepare report for continuous improvement

Total Hours (Deployment & Implementation - 1 week): 18 hours