ROLES OF THE REQUIREMENTS ANALYSTS & LIFE CYCLE ACTIVITIES
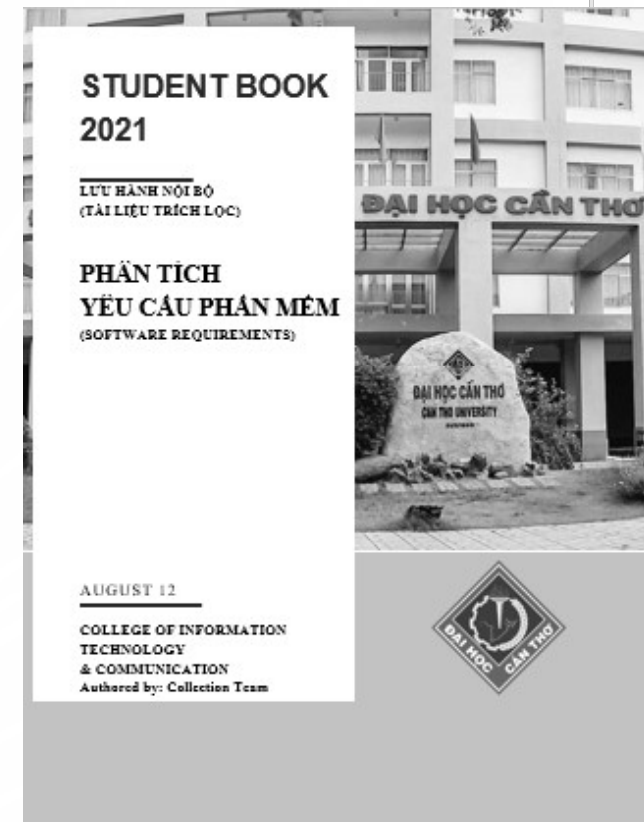## (LESSON 03)

PHÂN TÍCH YÊU CẦU PHẦN MỀM (SOFTWARE REQUIREMENTS)

CONTENTS

- Requirements analysts (or Requirements engineer)

- Why need requirements analysts?

- Roles of the Requirements analysts

- Life cycle activities

STUDENT BOOK
2021

LƯU HÀNH NỘI BỘ
(TÀI LIỆU TRÍCH LỌC)

PHÂN TÍCH
YÊU CẦU PHẦN MỀM
(SOFTWARE REQUIREMENTS)

AUGUST 12

COLLEGE OF INFORMATION
TECHNOLOGY
& COMMUNICATION
Authored by: Collection Team

REQUIREMENTS ANALYSTS (RA)

- The **RA is in a strategic position** to improve the practices in use on projects and in the organization.

- The analyst can have a **positive impact** on project success and also **facilitate the organization's improvement results** by performing in several roles.

- Software **requirements analyst** work is considered crucial in the software development lifecycle.

REQUIREMENTS ANALYSTS (RA)

> **Importance of requirements:** Unfortunately, it's noted that customers, managers, and developers undervalue requirements engineering.

- Making the RA's role **explicit contributes to a smoother process.**
- The RA's role can **be linked readily to business goals,** such as:
    - increasing customer satisfaction with the delivered work products;
    - reducing the time to market of products;
    - meeting cost, schedule, and quality objectives; and
    - utilizing the human resources of the enterprise more effectively.
- The RA's role **needs to be understood and valued** in the minds of Project Managers (PMs) and the technical communities (both computing and engineering).

WHY NEED REQUIREMENT ANALYSTS?

"A lot of times, people don't know what they want until you show it to them."

*So if the users don't know what they want, you may be relying on **analysts** and **developers**!!!*

https://www.cio.com/article/3066823/gathering-and-managing-software-requirements-for-buying-or-building.html

USER EXPERIENCIES OF ANALYSTS

? What happens when nobody on the team has the vision or inspiration to give software development the direction it needs? **(That means there wasn't a GOOD REQUIREMENT ANALYST in your team)**

- Examining multiple products that could potentially solve your problem, and rewriting their features as requirements delivers so much value.
- Typically this is done when buying software, but it also works when building software.
- By reverse engineering features into requirements across dozens of products, you are harvesting inspirations and ideas from perhaps hundreds of developers to show users what they might want.

All that brainpower presented to users can truly amplify inspiration in ways never thought possible.
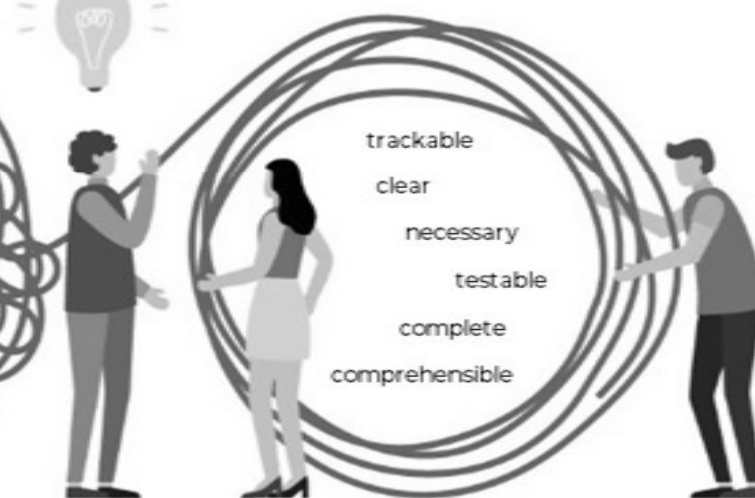
REMARKS

Bad Requirements

- inconsistent
- not aligned
- incomplete
- not implementable
- incomprehensible

Good Requirements

- trackable
- clear
- necessary
- testable
- complete
- comprehensible

Stated requirements are provided by a customer at the beginning of a system or software development effort.
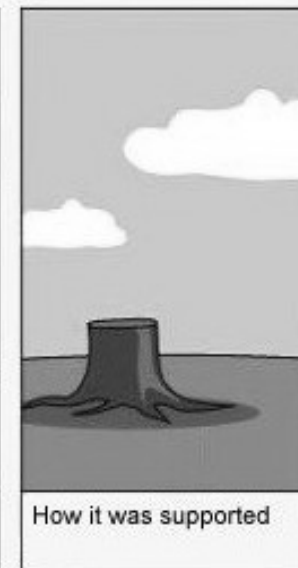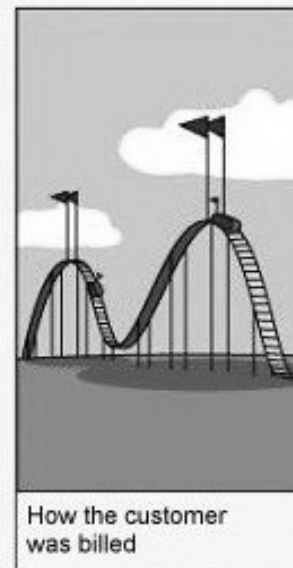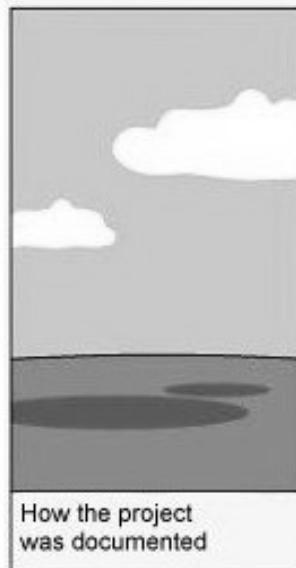
Real requirements reflect the verified needs for a particular system or capability. Note that some real requirements may be identified that the customer and users omitted in the stated requirements.

https://www.softwareone.com/en/blog/all-articles/2020/03/11/requirements-engineering-documentation-of-requirements

ISSUES RELATED TO MISUNDER-STANDING

How the customer explained it

How the Project Leader understood it

How the System Analyst designed it

How the Programmer wrote it

How the Business Consultant described it

How the project was documented

What operations installed

How the customer was billed

How it was supported

What the customer really needed

ROLES OF REQUIREMENTS ANALYSTS

Roles of Requirements analysts	System Initiation	System Analysis & Design	System Component Design	System Implementation	System Integration, Test and Evaluation	System Operations and Support
1. Làm việc cộng tác với khách hàng, người dùng, kiến trúc sư và nhà thiết kế hệ thống để xác định các yêu cầu thực sự đối với một hệ thống.	X	X	X	X	X	X
2. Làm việc hiệu quả với khách hàng và người dùng để thiết đặt cơ chế kiểm soát thay đổi.			X	X	X	X
3. Nhận diện những công nghệ mới hữu ích.		X	X			X
4. Tạo điều kiện thuận lợi cho việc tái sử dụng các tài nguyên có sẵn cho dự án và khả năng nhân bản công nghệ.	X	X	X	X		
5. Hỗ trợ dự án và khách hàng của dự án trong việc hình dung lộ trình tăng trưởng từ bản phát hành hoặc phiên bản đầu tiên cho đến sản phẩm cuối cùng.	X	X	X	X	X	X
6. Tư vấn cho dự án (và khách hàng) các phương pháp, kỹ thuật và công cụ tự động sẵn có để hỗ trợ tốt nhất cho công việc và hoạt động dự án liên quan đến yêu cầu.	X	X				X
7. Sử dụng các thước đo để đo lường, theo dõi và kiểm soát các hoạt động và kết quả công việc dự án liên quan đến các yêu cầu.	X	X	X	X	X	X
8. Thiết đặt môi trường cho các cuộc thảo luận và hòa giải các xung đột.	X	X	X	X	X	X
9. Nghiên cứu miền của khu vực mà hệ thống hoặc phần mềm đang được sử dụng.	X	X				X

ROLES OF REQUIREMENTS ANALYSTS

Waterfall Process

Roles of Requirements analysts	System Initiation	System Analysis & Design	System Component Design	System Implementation	System Integration, Test and Evaluation	System Operations and Support
1. Work collaboratively with customers, users, and system architects and designers to identify the real requirements for a planned system or software development effort to define the problem that needs to be solved.	X	X	X	X	X	X
2. Work effectively with customers and users to manage new and changed requirements so that the project stays under control. Install a mechanism to control changes.			X	X	X	X
3. Be alert to new technologies that may help.		X	X			X
4. Facilitate the project's reuse of artifacts and achieving repeatability.	X	X	X	X		
5. Assist the project and its customers in envisioning a growth path from the first release or version of a product through a set of staged releases to the ultimate system or product.	X	X	X	X	X	X
6. Advise the project (and customer) of methods, techniques, and automated tools that are available to best support requirements-related project work and activities.	X	X				X
7. Use metrics to measure, track, and control requirements-related project work activities and results.	X	X	X	X	X	X
8. Be able to facilitate discussions and to mediate conflicts.	X	X	X	X	X	X
9. Study the domain of the area in which the system or software is being used.	X	X				X

1. Work collaboratively with customers, users, and system architects and designers to identify the real requirements for a planned system or software development effort to define the problem that needs to be solved.

- Identifying the stated needs of customers and users. This involves reviewing things previously written about the proposed system, interviewing customers and users, studying relevant legislation, and so forth.

- Studying the business objectives for the proposed effort.

- Collaborating with customers and users in a joint or cooperative environment to analyze the stated requirements, evolve better requirements, and prioritize them (see the suggested techniques that follow).

- Involving system architects in requirements development. Iterating the draft or proposed requirements will result in a candidate architecture with better requirements and a more robust architecture.

- Utilizing an industry-strength automated requirements tool to support this work.

2. Work effectively with customers and users to *manage new and changed requirements* **so that the project stays under control. Install a mechanism to control changes.**

- The importance of controlling changes to requirements must be explained to customers, users, and developers so that the partnership commitment to project success is maintained.

- Developers must be trained not to accept unauthorized requirements changes. All requests for changes, no matter how trivial, must be funneled through the change control mechanism.

- The change control mechanism should be a joint team that includes empowered decision makers representing the customer and the developer. Should meet frequently enough to have a reasonable number of change requests to consider.

- Consider using releases, versions, and upgrades. Package increments of requirements upgrades and changes in subsequent releases or system upgrades.

- Ensure that your contract provides for additional time and budgeting for all changes. Changes cost time and money. This should be recognized up front and reflected in the contract.

3. Be alert to *new technologies* **that may help.**

- A role that is often underutilized is advising the customers concerning evolving technology.

- Customers are typically focused on what the system needs to do. We can serve them best by being familiar with evolving technologies that improve how the needed system is designed.

- Concurrently with requirements elaboration, involve a small team of designers to review the real requirements for cost, schedule, technology, and risk impacts.

- Use trade studies — e.g. the Decision Analysis & Resolution (DAR) process in CMMI terminology — to evolve alternatives.

- Keep the customer involved in these activities, so that when opportunities arise, the customer is there to partner with you in making recommendations for decisions.

- There has been a lot of discussion in the industry literature about reuse. Reuse has two meanings:

  (1) to take object X (e.g., an object, subroutine, or COTS software) that was done by Y and use it directly in another project, and

  (2) to tailor a developed work product (a specification, a plan, or process, for example).

  Issues: Many organizations have invested in reuse strategies only to conclude that they are not viable or practical. Others are wary of reuse because they believe it precludes unprecedented solutions and incorporates the errors of the reused work products.

  By "tailoring," we mean modifying, extracting pieces from, elaborating, or adapting a process or document for another use. Reuse of tailored artifacts saves time and money and is an advantage of a process-oriented approach.

5. Assist the project and its customers in *envisioning a growth path* **from the first release or version of a product through a set of staged releases to the ultimate system or product.**

- This role is related to role 3. The RA can serve an important and valuable role in helping customers to envision and evolve a series of releases or versions of products.

- This suggests that an "incremental development approach" should be used, in which the full system is implemented over a period of time through increments of delivered functionality.

- Independently of the system development methodology used (waterfall, incremental, spiral, evolutionary, Agile, etc.), there has to be an agreed-upon process for managing changes and determining the scope of individual projects.

- No matter how much discussion and testing is done, there are some missing requirements that won't be discovered until the system is in production.

6. Advise the project (and customer) of *methods, techniques, and automated tools* **that are available to best support requirements-related project work and activities.**

- Experience has shown that methods and techniques vary in their applicability and effectiveness and that often automated tools purchased by projects and organizations are not used or are underutilized.

- The development work is challenging enough without introducing the complexity of methods or techniques that are not familiar and haven't been used successfully on previous projects in the organization.

  - At the project level, the team should stick with the familiar tools, processes, and techniques.

  - At the organizational level, the project should try to use the tools, processes, and techniques that are known and proven in the organization.

- When contractors are brought into an existing effort, they should adapt to the tools that the customer already has in place (assuming they are working effectively).

7. Use metrics to *measure, track, and control* **requirements-related project work activities and results.**

- The things that are measured and tracked and that management pays attention to are the ones that improve. This suggests that it's not sufficient to have a few useful metrics — they must be tracked, and they must be used by management to guide project decisions.

- There is a set of measures or metrics that should be used by all projects.

- There is another level of sophistication that should be used by mature projects and organizations. As used here, "mature" means that processes have been defined, documented, implemented, used, institutionalized, and continuously improved over a period of at least two to four years.

- This involves quantitative management (QM) of cost, schedule, quality, and process metrics and baselines in support of specific business objectives.

- This role stresses the "people skills" of the RA. We've learned that being well qualified technically is important, but that it's also necessary to have strong, well-refined people skills.

- Experience has shown that two heads are better than one—whenever we take the time to explore ideas and approaches with others, we get even better ideas and approaches.

- Become a good facilitators and mediators. There are courses available to assist (e.g., negotiating skills, team building, communications, relationships, and leading).

- Having a "win-win" perspective is helpful — in fact.

9. *Study the domain of the area* **in which the system or software is being used.**

- Be able to grasp, abstract, and express ideas quickly in the users' language.
- If the RA does not understand the user domain almost as well as the users do, he risks limiting his role to that of an order taker.

SUMMARY

- The RA performs several important roles on a project and in an organization. 09 important roles were identified and described in this chapter:
  - The first two are paramount and essential to project success.
  - Accordingly, study these, become proficient in them, and assist your project and organization in adopting, implementing, and institutionalizing related practices.
- Organizations should consider taking specific steps to develop and leverage their RAs, such as
  - (1) ensuring that experienced RAs are assigned to each project;
  - (2) providing appropriate training for RAs;
  - (3) assigning experienced RAs to mentor new employees, junior RAs, and interns; and
  - (4) having an organizational requirements working group to share expertise and provide a resource to the organization.