

Introduction to Software Engineering

Software Engineering Course - 1
2024-2025



Lecturers



Rareş Cristea

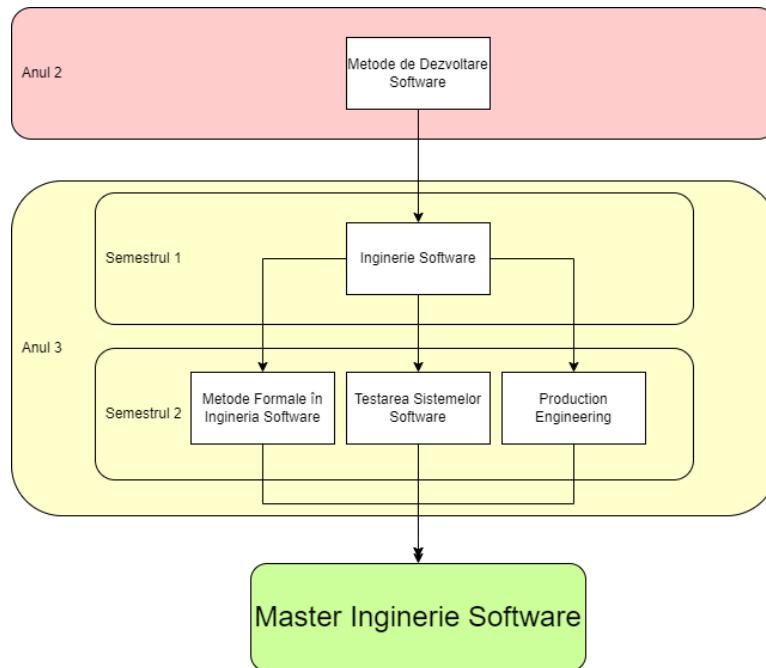
- BA in CS '18 @ UniBuc
- MsC in Software Engineering '20 @UniBuc
- PhD Candidate in IoT since '20
- Software Engineer and Team Lead roles since 2018
- Currently Software Engineer @Bookster



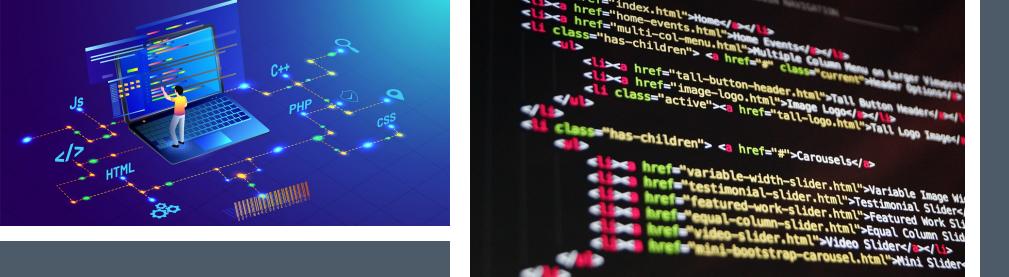
Petru Soviany

- BA in CS'15 @ UniBuc
- MsC in Databases and Web Technologies '17 @UniBuc
- PhD in Computer Vision 21' @UniBuc
- Front End Developer since 2016
- Currently Senior Frontend Developer @Luxoft





Software Engineering roadmap @ Informatics FMI

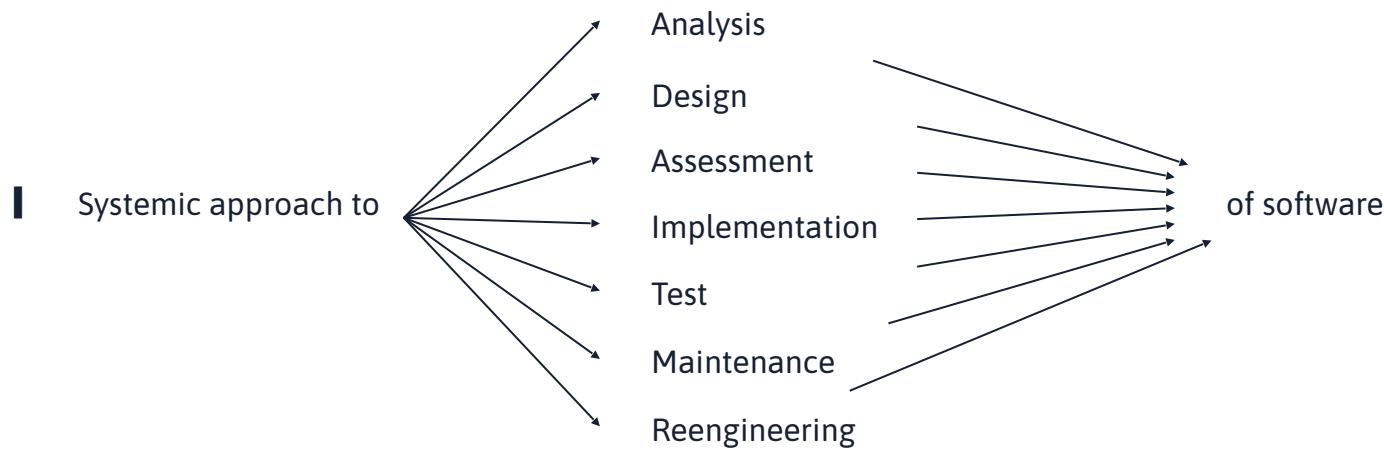


01

What are we studying?



What is Software Engineering?



Software Development Lifecycle (SDLC)

Stage 6: Maintenance

The maintenance phase of the SDLC occurs after the product is in full operation. Maintenance of software can include software upgrades, repairs, and fixes of the software if it breaks.

Stage 5: Testing

In the fifth stage, all the pieces of code are tested to verify and validate a software product. This is done to check the correspondence between the real and expected behavior of a requirement.



The Development Phase includes several activities that are the responsibility of the developer. The developer places the outputs under configuration control, performs change control, documents and resolves problems and non-conformances found in the software products.

Stage 1: Analysis

The needs of the software project are identified, the problem or opportunities stated, the goals are align with business requirements.. Market research is carried out, and the needs of the target audience who will use the product are determined to implement a project plan.

Stage 2: Planning

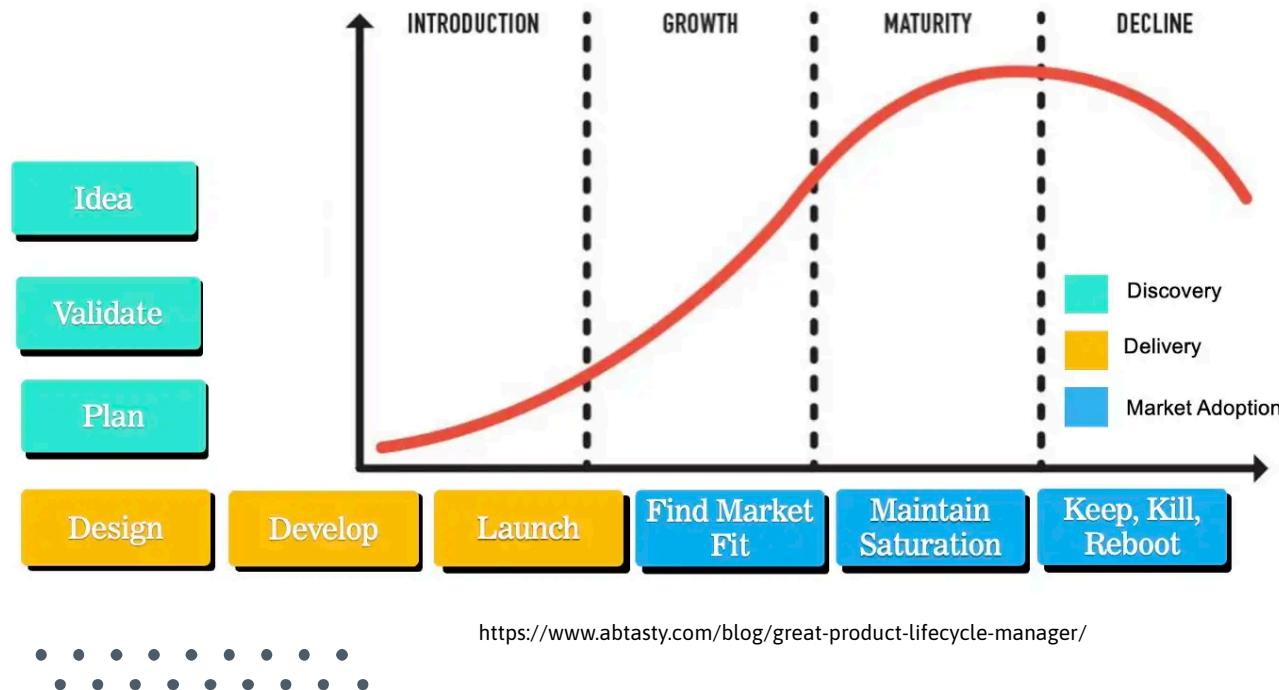
The purpose is to outline the scope of the problem and identify solutions, also to evaluate the feasibility of the project. Resources, costs, time, and other aspects should be considered here. The project plan is developed that identifies, prioritizes, and assigns the tasks and resources required to build the structure for a project.

Stage 3: Designing

Focuses on converting the information gathered during the planning and analysis phase into clear requirements for the development team, defining one or more designs through which to achieve the project result. Architecture of the software product is also defined in this phase.



Product lifecycle

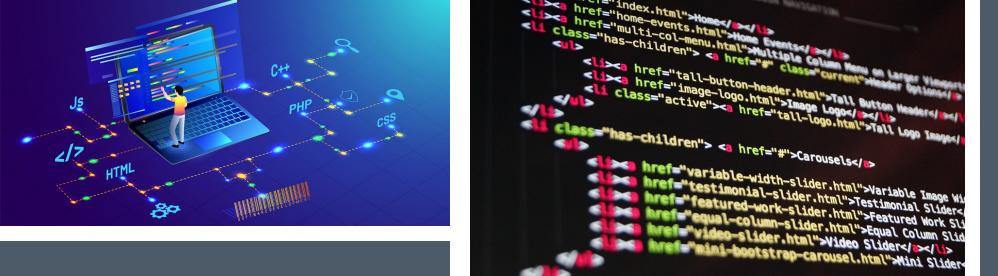


Roles in SDLC



What we will focus on?

- | Web-centric Software Products
- | Software Architecture (using C4 Architecture modeling)
- | How does this knowledge apply in software organizations?
- | Better understanding the roles in a software organization.
- | Building on top of MDS knowledge.



02

Organizing

Switching to Romanian in 3... 2... 1...

Topici prevăzute

		Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
		02.10.2024	08.10.2024	15.10.2024	22.10.2024	29.10.2024	05.11.2024	12.11.2024	19.11.2024
Course	Name	Introductory Course	Agile Software Engineering + Features, Scenarios and Stories		Software Architecture Decision Making	Software Architecture Visualization	Software Architecture Implementation	Microservices Architecture	User Experience & User Interface
Lecturer	ALL	Rareş Cristea	Rareş Cristea	Probabil plecați	Petru Soviany	Rareş Cristea	Rareş Cristea	Rareş Cristea / Petru Soviany	Petru Soviany

Week 9	Week 10	Week 11	Week 12	Holiday 1	Holiday 2	Liber	Week 14	Evaluare
26.11.2024	03.12.2024	10.12.2024	17.12.2024				16.01.2025	31 ian - 2 feb
Security and Privacy	Quality Assurance in Software Development	DevOps + Code Management	Software Engineering Profession (Drept)				Recap + Q&A	
Rareş Cristea	Rareş Cristea	Rareş Cristea	Rareş Cristea	av. Alex Moraru +			Rareş Cristea	Rareş Cristea

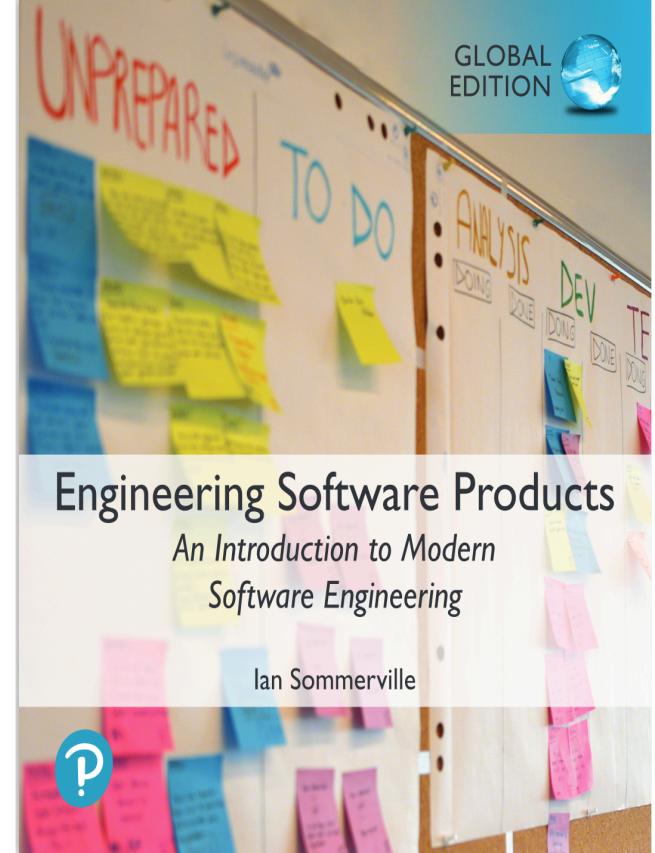
Materiale

Suporțul de curs:

- Acces la PowerPoint-uri – explicate la curs
- Carte suport (imagine) – va fi în Teams.
- Veți primi la fiecare curs capitolele relevante pentru cursul următor.
- Referințele menționate la finalul PowerPoint-urilor
 - Videoclipuri
 - Articole

Comunicare:

- Primim întrebări despre curs, evaluare pe channelul de Teams
- Primim DM-uri doar dacă e o problemă sensibilă (medicală, sau alte asemenea)



1booi3p

Where do I enter the code?

Click **Join or create a team** below your teams list and look for the **Join a team with a code** card

Evaluarea

- Evaluare în baza unui Proiect Software de Echipă
- Echipele vor fi formate din **4-6 studenți**. Vă construți singuri echipele. Membrii echipelor pot fi cross-grupe, și cross-serii.

Project nou

You will implement a software development project that delivers a **software-based product** respecting the initial **product vision**.

You will engage in **all the SDLC phases**.

A **working demo** of the application must be presented at the end of the semester.

Continuare MDS

You must define your MDS application as a **software product (product vision)**.

You need to create a **product description that explains what is already done** in the application

Submit the existing software application (dated repository is fine)

You will implement a software development project that continues delivery on the initial **product vision**, engaging in **all the SDLC phases**.

A **working demo** of the application must be presented at the end of the semester.

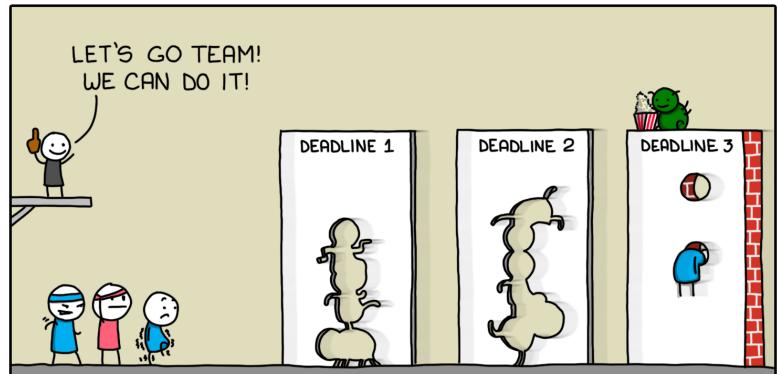
Evaluarea

Etapa 1 - Formarea echipei

- Stabiliți Echipa
- Stabiliți ce vă doriți să faceți
- Până pe **13.10 23:59** un membru (**doar**) al echipei completa formularul de înscriere (trebuie să conțină **Product Vision-ul**).
- Dacă ați fost 3 în echipa pentru MDS, mai trebuie să luați un coleg în echipă.
- Nu puteți fi 7 în echipă.

TEAMWORK

MONKEYUSER.COM



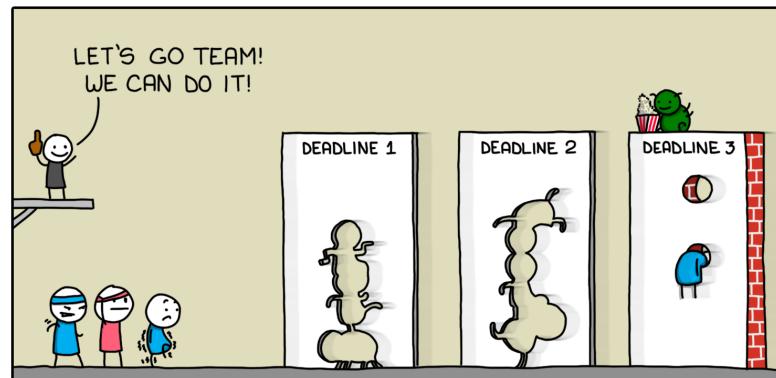
Evaluarea

Etapa 1.5 - Înscrierea

- La cursul 2 voi deschide formularul de inscriere al echipei
- Vă voi face onboarding-ul pe GitHub Classroom
- Toate proiectele și artefactele aferente vor fi ținute în repository-ul creat de Classroom. **Ce nu e în acest repo, nu se ia în considerare în evaluarea proiectului**
- Este necesar să folosiți același nume de echipă și în formular și în GitHub Classroom, ca să vă pot identifica.

TEAMWORK

MONKEYUSER.COM



Evaluarea

Etapa 2 – Participarea la curs

- Are loc în fiecare săptămână de două ori
- În fiecare săptămână, la finalul cursului, vom avea câte un quiz pe Kahoot!
- Quiz-ul se răspunde individual.
- În quiz vor fi întrebări din cursul prezentat, dar și din materialul bibliografic al acelui curs.

		Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Holiday 1	Holiday 2	Liber	Week 14	Evaluare
		02.10.2024	08.10.2024	15.10.2024	22.10.2024	29.10.2024	05.11.2024	12.11.2024	19.11.2024	26.11.2024	03.12.2024	10.12.2024	17.12.2024				16.01.2025	31 ian - 2 feb
Course	Name	Introductory Course	Agile Software Engineering + Features, Scenarios and Stories		Software Architecture Decision Making	Software Architecture Visualization	Software Architecture Implementation	Microservices Architecture	User Experience & User Interface	Security and Privacy	Quality Assurance in Software Development	DevOps + Code Management	Software Engineering Profession (Dept)				Recap + Q&A	
Lecturer	ALL	Rareș Cristea	Rareș Cristea	Probabil plecați	Petru Soviany	Rareș Cristea	Rareș Cristea	Rareș Cristea / Petru Soviany	Petru Soviany	Rareș Cristea	Rareș Cristea	Rareș Cristea	Rareș Cristea	av. Alex Moraru + Rareș Cristea			Rareș Cristea	Rareș Cristea

Evaluarea

Etapa 3 – Livrabilul intermediar

| Va exista un livrabil intermediar

Până pe **03.11.2024, ora 23:59** va trebui să încheiați etapele de

Analysis

Planning

Design

Va trebui să aveți în repository-ul vostru:

- * Product Vision (în README.md –ul repository-ului)
- * Product Features, Scenarios, și User Stories (folosind GitHub Projects, GitHub Issues, și, eventual documente în .md – prezentat în cursul 2)
- * Backlog prioritizat de issues din toate User Stories
- * Diagrame C4 (sau UML) pentru descrierea desired architecture

Încercăm în 2-3 săptămâni după deadline să oferim și feedback.

Evaluarea

Etapa 4 – Livrabilul final

| În sesiune se va prezenta livrabilul final.
Până **în sesiune** va trebui să încheiați etapele de
Implementare
Testare
Mentenanță

Va trebui să aveți în repository-ul vostru:

- * Codul sursă al proiectului
- * Un demo video prezentând funcționalitățile aplicației
- * Diagrame de Sistem, Container și o componentă (C4)
- * Raport de arhitectură

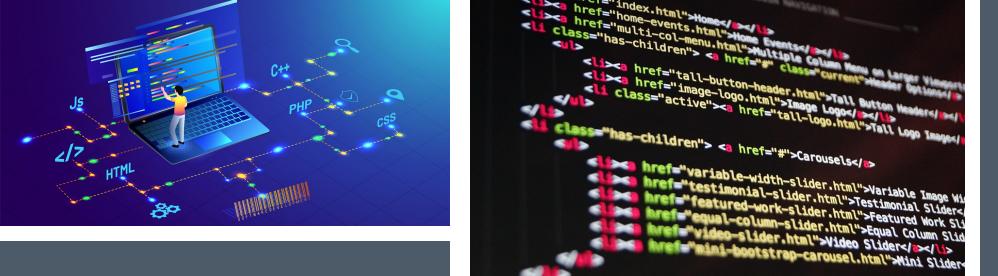
Evaluarea

Puteți lua maximum 110 puncte din 100

- 80 de puncte pentru proiect
 - 30 de puncte pentru livrabilul intermediar (veti primi punctele abia la momentul evaluării finale)
 - 50 de puncte pentru livrarea finală
- 30 de puncte pentru quiz-urile care au loc la curs și
 - 10 cursuri = 10 quiz-uri.
 - Fiecare quiz va valora 3 puncte.
 - Încă 2 puncte se mai acordă dacă ai participat la 3 quizuri consecutive. Se acordă o singură data.
 - Punctajul din quiz se acordă doar dacă luați măcar 45 de puncte din proiect.

Quiz time!

Kahoot!



03

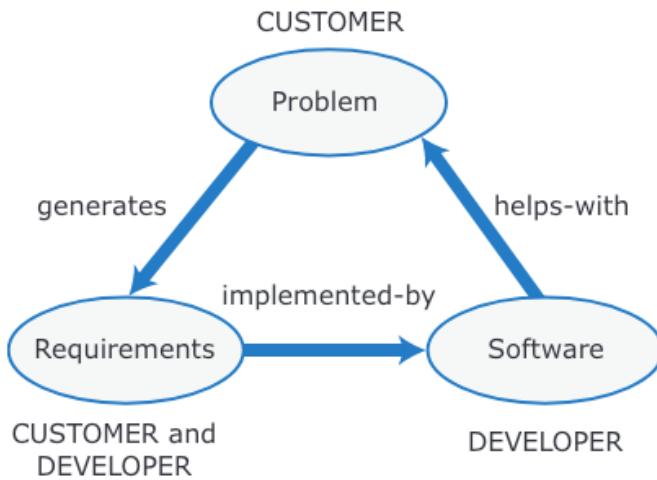
Software Products

Software Products

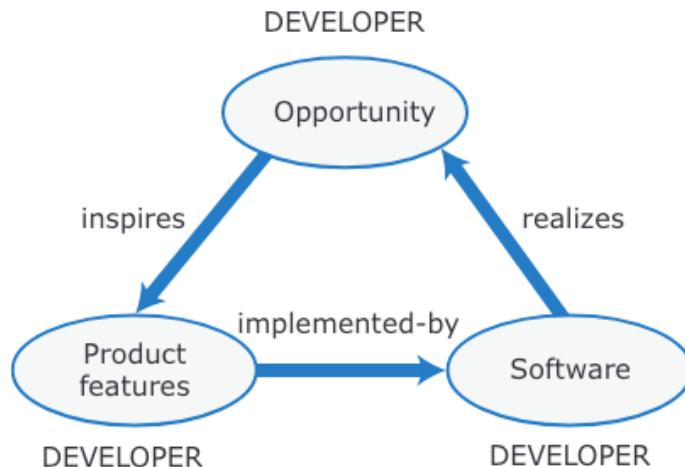


Projects vs. Product based Software Engineering

Project-based



Product-based



Types of software organizations

Product based organization

Has its own product to sell to consumers through the market.

Focuses on product development, innovation and quality.

Limited or no interaction with the customer

Product companies work for years keeping one technology/
product in mind

e.g. Amazon, Google, SAP, IBM, Microsoft, Adobe, Salesforce

Consultancy / Service organization

Offers services to its clients.

Focuses on employee expertise, solutions to their clients and
customization.

Ongoing, close interaction with clients

More frequent change of project, technology, domain.

Accenture, McKinsey, IBM, Cognizant, Endava, Tremend (Publicis
Sapient)

More info: A Comprehensive Guide to Different Types of Software Companies for Software Engineering Careers - [Link](#)

Types of services



Types of services

- Strategy
- Consulting in digital, technological, operational areas
- Software development, etc



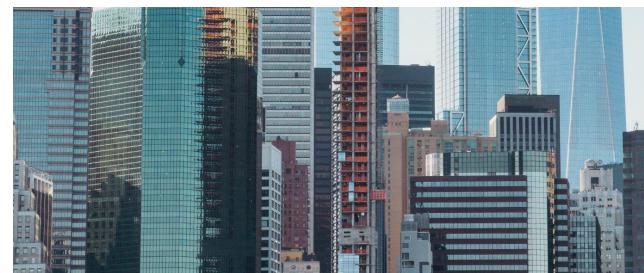
Types of Software Development Services

- Custom software development services
- Mobile software development services
- Web development services (CMS, Platforms - PHP, JAVA, .NET, Cloud computing)
- Embedded systems development



Models in Consulting

- Team augmentation - where a person or team might join an existing team for a short time to help accelerate some development
- Outcome-based consulting - where a team will identify product-market fit or problem-solution fit and build the solution



Product Vision



FOR (target customer)

FOR entertainment consumers enthusiastic about on-demand streaming.

WHO (statement of need or opportunity)

The users WHO value the ability to watch content instantly without the need for physical media.

The (PRODUCT NAME) is a (product category)

NETFLIX is an on-demand streaming platform

THAT (key benefit, compelling reason to buy)

THAT is fast to varied access personalized content

UNLIKE (primary competitive alternative)

UNLIKE unpersonalized traditional TV, poorly varied distributor centered streaming platforms (Showtime TV), slow streaming providers.

OUR PRODUCT (statement of primary differentiation)

OUR PRODUCT delivers original and beloved content through a personalized experience anywhere anytime.

Geoffrey Moore, Crossing the Chasm: Marketing and selling technology products to mainstream customers (Capstone Trade Press, 1998).

<https://productled.com/blog/netflix-product-strategy-2020>

Next time on ...

Course 2

Please read from *Engineering Software Products* (Sommerville):

- Chapter 2.1 – Agile Methods (4 pages)
- Chapter 2.3.3. - Self-organizing teams (5 pages)

Please read from *Software Architecture for Developers* (Brown):

- * Chapter 10 - Managing technical risks (7 pages)

