COSC 205

Project Management

Ajayi, Olasupo O. PhD.
Department of Computer Sciences
Okanagan College
Winter, 2023

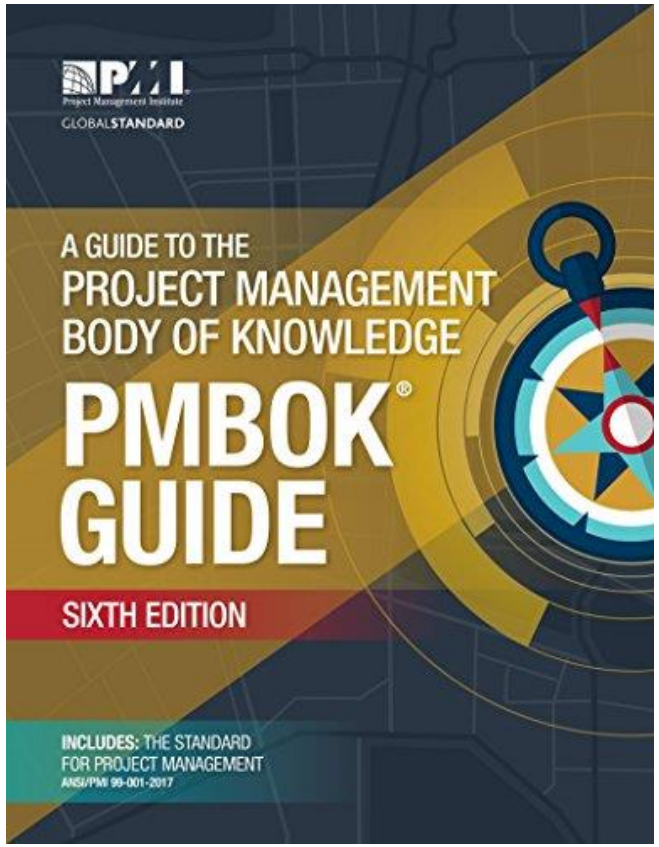
Course Outline

- Introduction to Project Management
  - PM, SDLC, JIRA
  - Agile / Scrum
- Software/Tool Evaluation
  - Tool evaluation and review
- Integration & Scope
- Time Management
  - Gantt Chart
  - Critical Path
- Cost Management
- Quality
- Human Resource
- Communication
- Risk
- Procurement

Lab Sessions

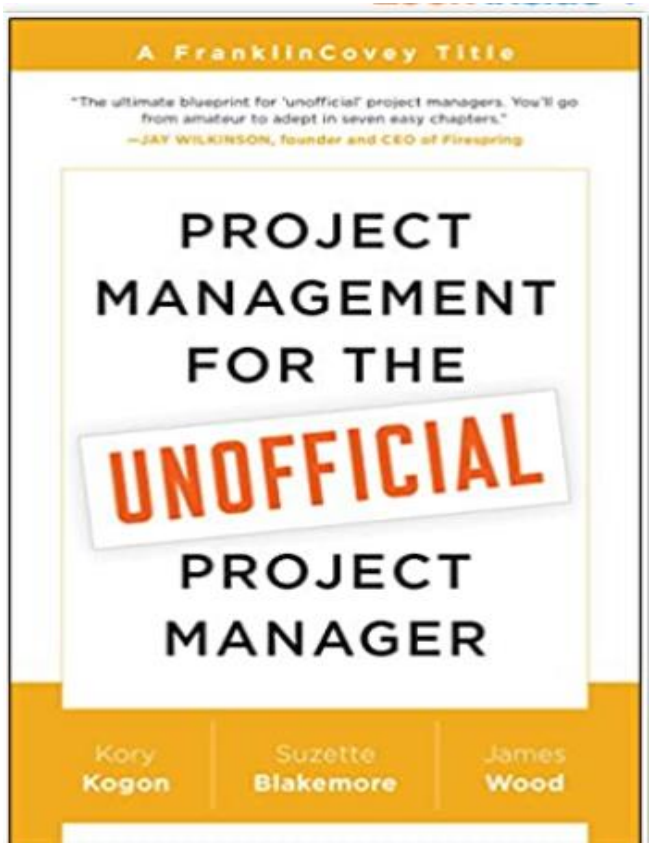
- JIRA setup
- Tools review
- Costing with MS Excel
- Gantt Chart
- Presentations

Suggested Texts



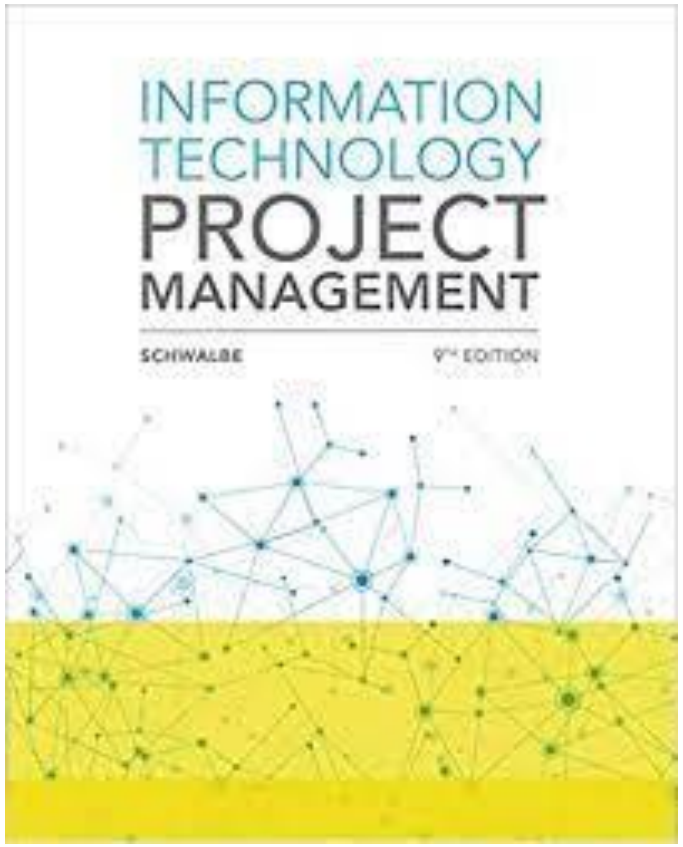
A Guide to the Project Management Body of Knowledge by Project Management Institute

by PMI



Project Management for the Unofficial Project Manager

by Kory Kogon, Suzette Blakemore, James Wood



Information Technology Project Management

By Schwalbe, K.

Lecture IA

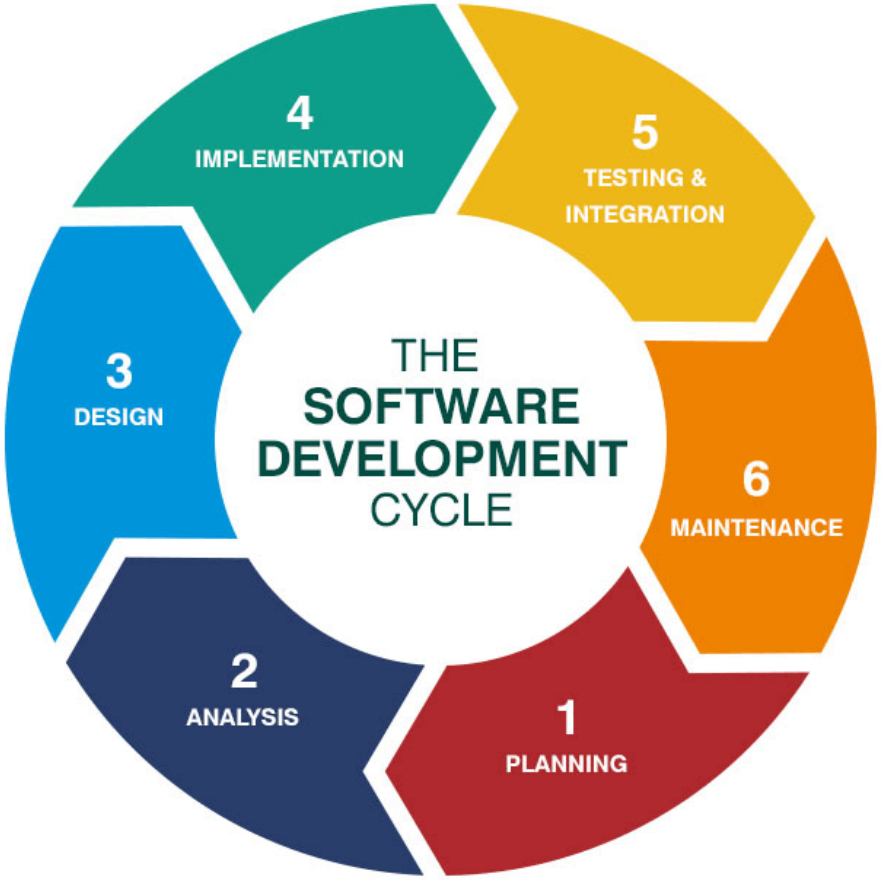
Introduction to PM

Learning Objectives:

- PM in relation to IT
- Common PM methodologies and approaches
- Familiarization with PM tools

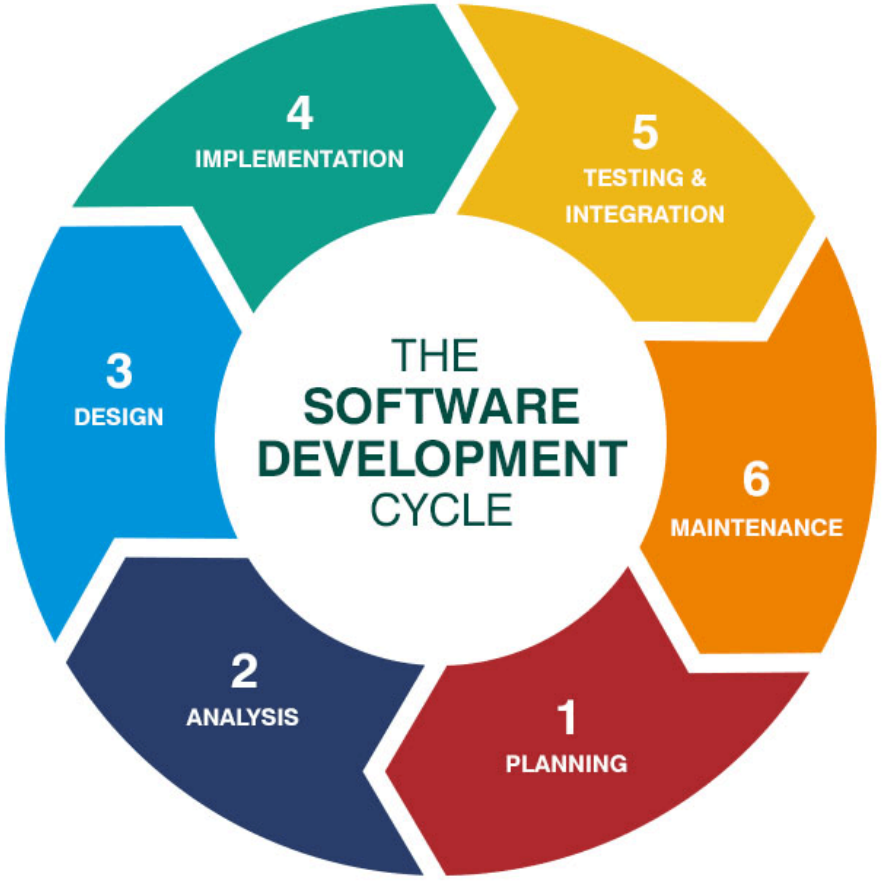
Software Development Life Cycle

- Planning
  - Problem identification / problem statement – A complete, precise and unambiguous statement of the problem to be solved
  - [Could also include feasibility study of the product]



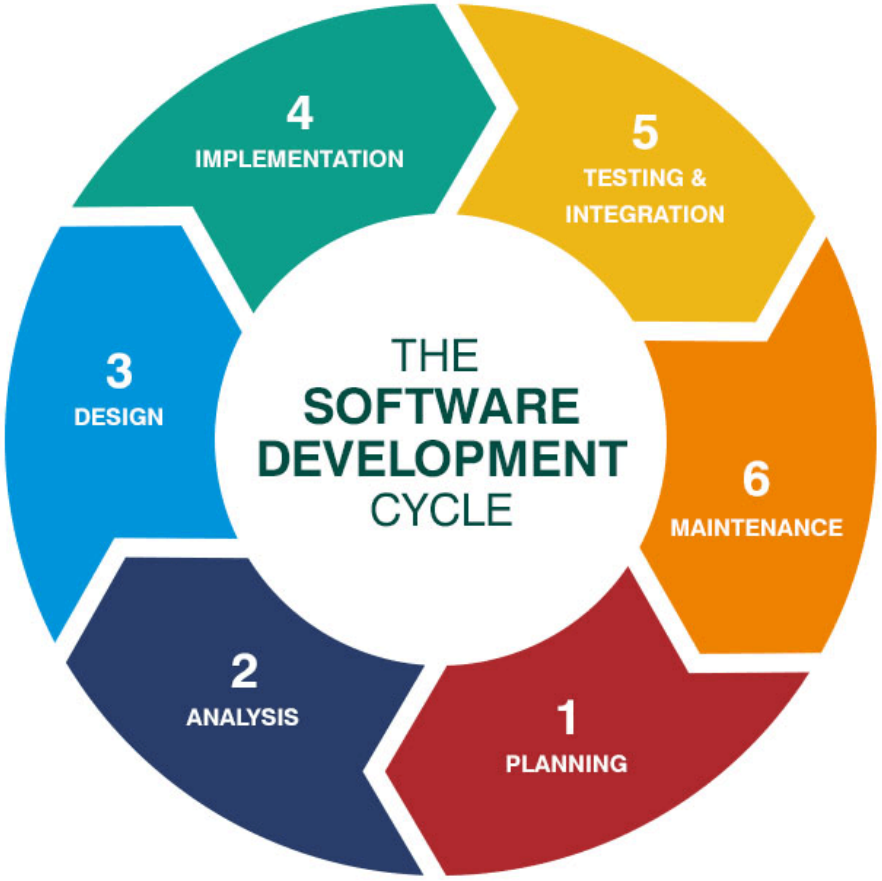
Software Development Life Cycle

- Analysis
  - Determine requirements
    - Resource allocations
    - Capacity
    - Cost estimation
  - Identify the input, output, procedures
  - Outputs a SRS (Software Requirement Specification) document.



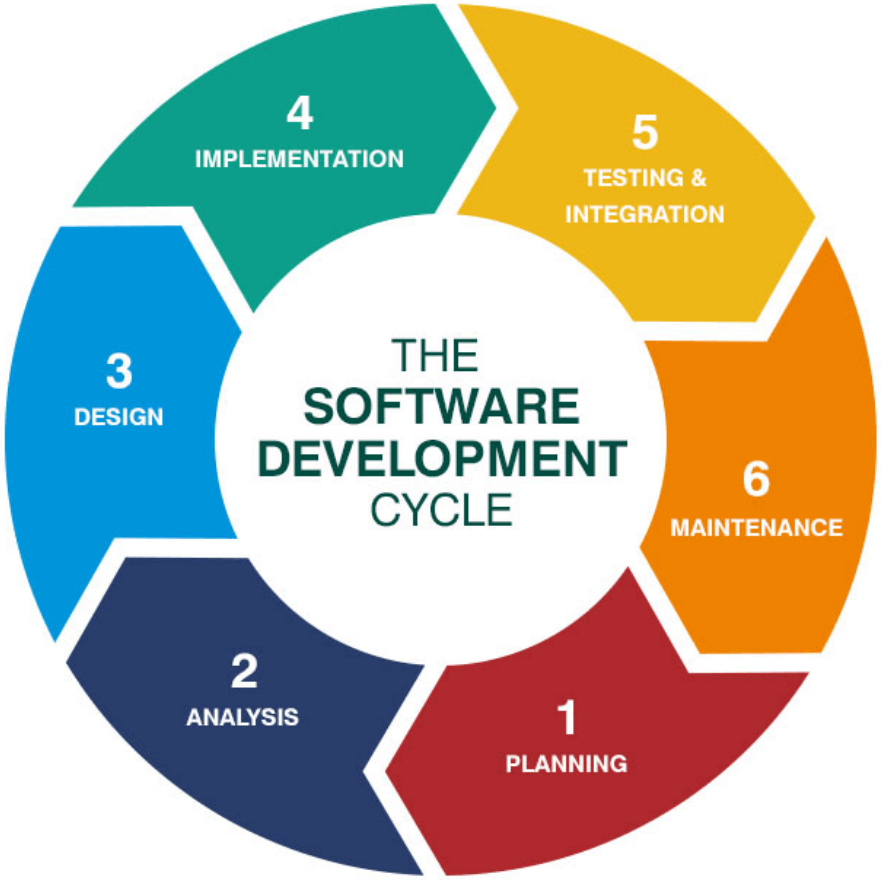
Software Development Life Cycle

- Design & Prototyping
  - Create model solutions
  - User Interface / User Experience
  - Programming
  - Security, Architecture etc.
  - Algorithm, flowcharts, model diagrams etc.



Software Development Life Cycle

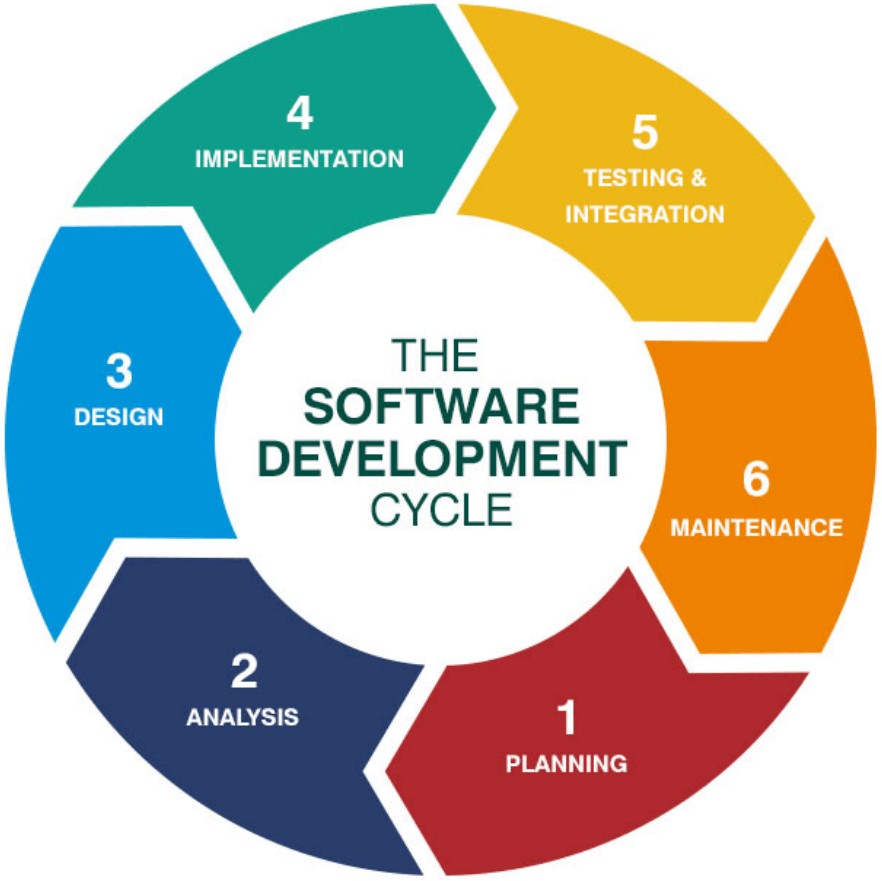
- Implementation
  - Translation of the designs into codes.
  - Can be done in iterations
  - Single developer or team.



Software Development Life Cycle

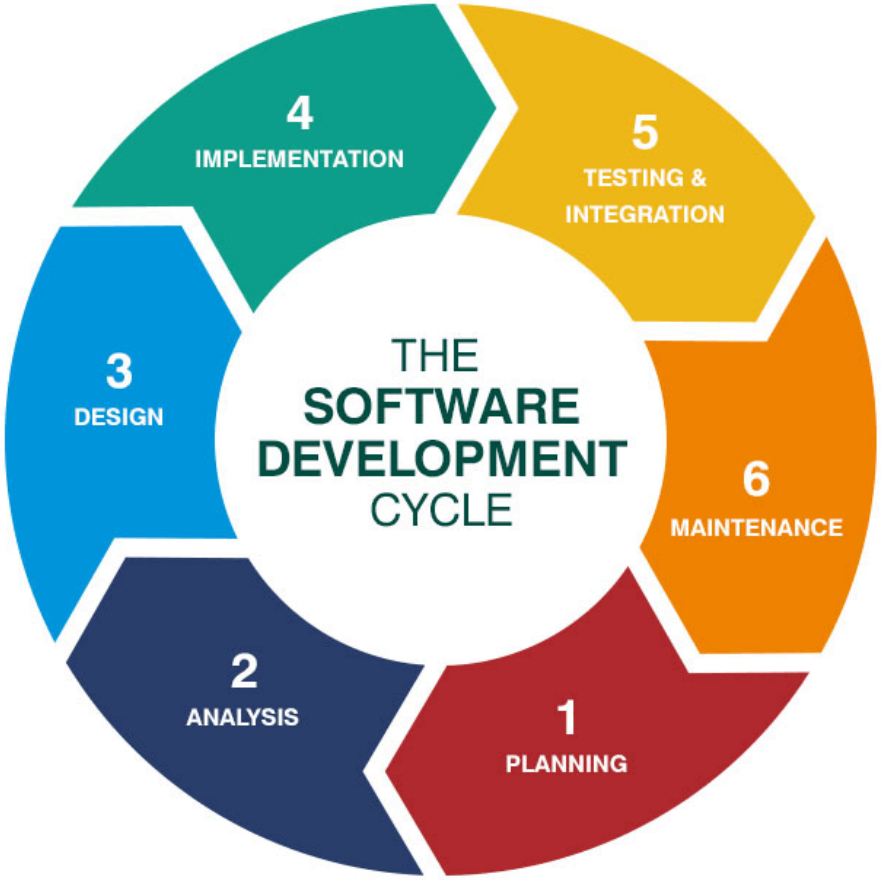
- Testing & Integration
  - User acceptance tests
  - Unit & entity testing - dealing with bugs and errors

- Once fully tested and error free, the software can be deployed / integrated into the intended system.



Software Development Life Cycle

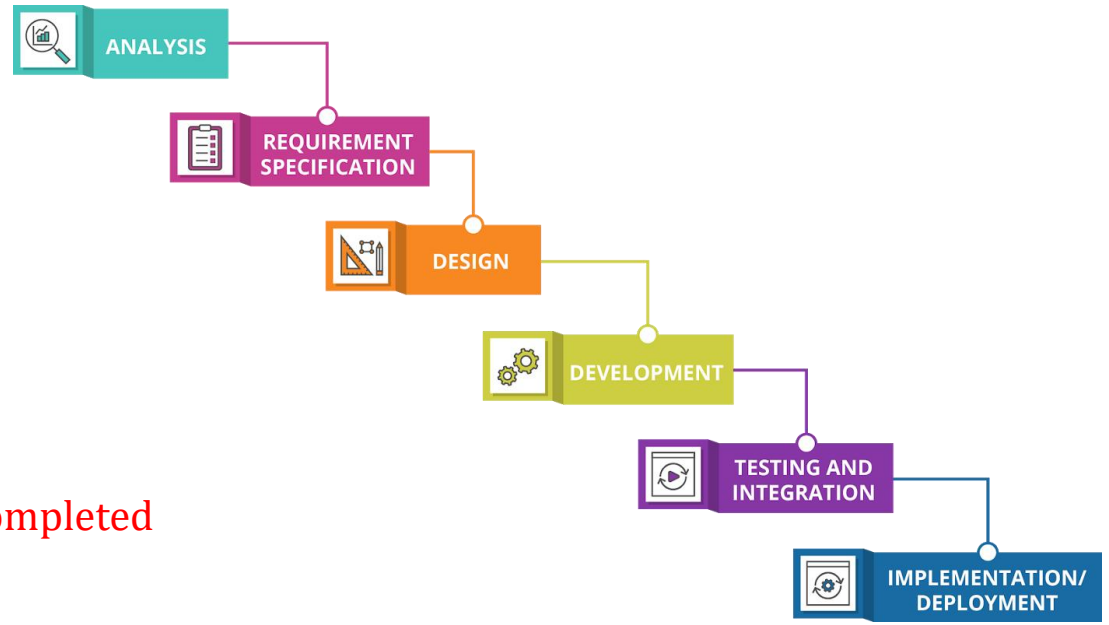
- Operation & Maintenance
  - Usage of the software
  - Corrective and preventive maintenance are done to ensure continuous functionality at accepted standard
  - Inclusion of potential upgrades



Classic Software Development Models – Predictive Models

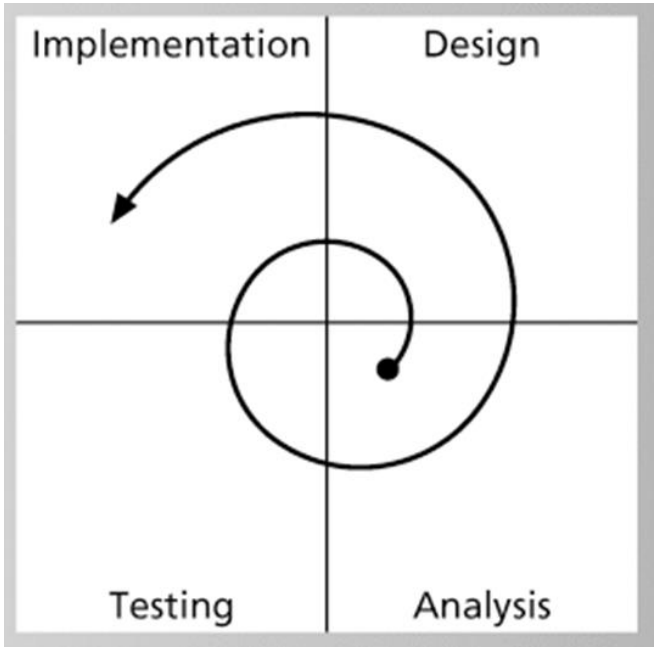
- **Waterfall**
- Sequential development process
  - linear progression from the beginning to the end of a project.

- Thorough planning before commencement
- Cost is well thought of.
- Proper documentation
- Rigid change implementation
- Monolithic application development
  - Minute change affects the entire system
- Can take a long time to complete
- Software might no longer be useful when finally completed



Classic Software Development Models – Predictive Models

- Spiral:
  - Iterative / spiral approach, rather than linear as with Waterfall
- Incremental build model:
  - provides for progressive development of operational software
- Prototyping model:
  - used for developing prototypes to clarify user requirements
- Rapid Application Development (RAD) model:
  - used to produce systems quickly without sacrificing quality



Contemporary Software Development Models - Agile

- **Predictive Models were…**

- Time-consuming.
- One stage must be completed before moving to the stages.
- Best suited for projects where requirements are stable.
- The working software is delivered only after completion of the final stage of the model.
- It is very difficult to go back to the previous stages and make some changes that you had not thought about in the initial phase.

- Enter AGILE

- **Agile / Adaptive Models**

  - Adaptive planning
  - Rapid & Flexible response to change
  - Evolutionary planning & development - Requirements evolve with project
  - Multi-party collaboration
  - early delivery,
  - Continual improvement

Classic Software Development Models – Predictive Models

- Scrum:
  - Advocates continuous and fast delivery of usable software, as well as rapid change integration based on client requirements.
- Lean:
  - "Just in time production". The aim of Lean is to increase the speed of software development and to reduce its cost.
- Kanban:
  - Pull vs push: workers pull in work according to their capacity, as opposed to work being fed to them.
- Extreme Programming (XP):
  - Focuses on customer interaction and satisfaction.

Lecture II

Lecture 2

Learning Objectives:

- Discuss the relationship between project, program, and portfolio management and the contributions each makes to enterprise success
- Understand the role of project managers by describing what they do, what skills they need, and career opportunities for IT project managers
- Describe the project management profession, including its history, the role of professional organizations like the Project Management Institute (PMI), the importance of certification and ethics, and the advancement of project management software

Introduction

- Many organizations today have a new or renewed interest in project management
- Worldwide IT spending is projected to hit $4.6 trillion in 2023 according to Gartner, a 3.4% growth from 2022 despite Covid!
- The Project Management Institute estimates demand for 15.7 million project management jobs from 2010 to 2020, with 6.2 million of those jobs in the United States

Project Management Statistics

- As of 2022, the average salary of project management profession was US$132,000/annum in Switzerland, US$116,000 in the United States; US$101,000 in Australia, US$75,000 in Canada.
- The top skills employers look for in new college graduates are all related to project management: team-work, decision-making, problem-solving, and verbal communications

- Organizations waste $109 million for every $1 billion spent on projects, according to PMI's Pulse of the Profession® report

Motivation for Studying Information Technology (IT) Project Management

- IT Projects have a terrible track record, as described in the What Went Wrong? https://www.pmi.org/learning/library/project-management-failures-in-tech-10247
- A 1995 Standish Group study (CHAOS) found that only 16.2% of IT projects were successful in meeting scope, time, and cost goals; over 31% of IT projects were canceled before completion.
- A PWC study found that overall half of all projects fail and only 2.5% of corporations consistently meet their targets for scope, time, and cost goals for all types of project.

Advantages of Using Formal Project Management

- Better control of financial, physical, and human resources
- Improved customer relations
- Shorter development times
- Lower costs
- Higher quality and increased reliability
- Higher profit margins
- Improved productivity
- Better internal coordination
- Higher worker morale

What is a Project?

- A **project** is a **temporary** endeavor undertaken to create a unique product, service, or result (PMBOK® Guide)
- Operations is work done to sustain the business.
- Projects **end** when their objectives have been reached or the project has been terminated
- Projects can be large or small and take a short or long time to complete

Examples of IT Projects

- A team of students creates a smartphone application and sells it online
- A company develops a driverless car
- Building a house or condo
- A government group develops a system to track child immunizations
- A global bank acquires other financial institutions and needs to consolidate systems and procedures

Top Strategic Technologies

- 3D printing
- Artificial Intelligence
- Cloud / Edge/ Fog Computing
- Digital Twins
- Mobile
- The Internet of things
- Pervasive, advanced, and invisible analytics
- Ubiquitous / Pervasive Computing everywhere

Media Snapshot: Unproductive Apps

- Gartner predicted that by 2014 there would be more than 70 billion mobile application downloads every year, but it was almost double!
- Social Media apps are by far the most downloaded – Tiktok, Instagram, Facebook, and WhatApp being the top globally in 2021-2022.
- The most popular category of all apps continues to be games

Project Attributes

- A project
  - **has a unique purpose**
  - **is temporary**
  - **is developed using progressive elaboration**
  - requires resources, often from various areas
  - should have a primary customer or sponsor
    - The **project sponsor** usually provides the direction and funding for the project
  - involves uncertainty

Project and Program Managers

- **Project:** a temporary endeavor undertaken to create a unique product, service, or result.

- **Program**: group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually.

- **Portfolio**: a group of different programs and/or projects within the same organization, which may be related or unrelated to one another, but managed together to achieve strategic objectives.

(PMBOK® Guide)

Project and Program Managers

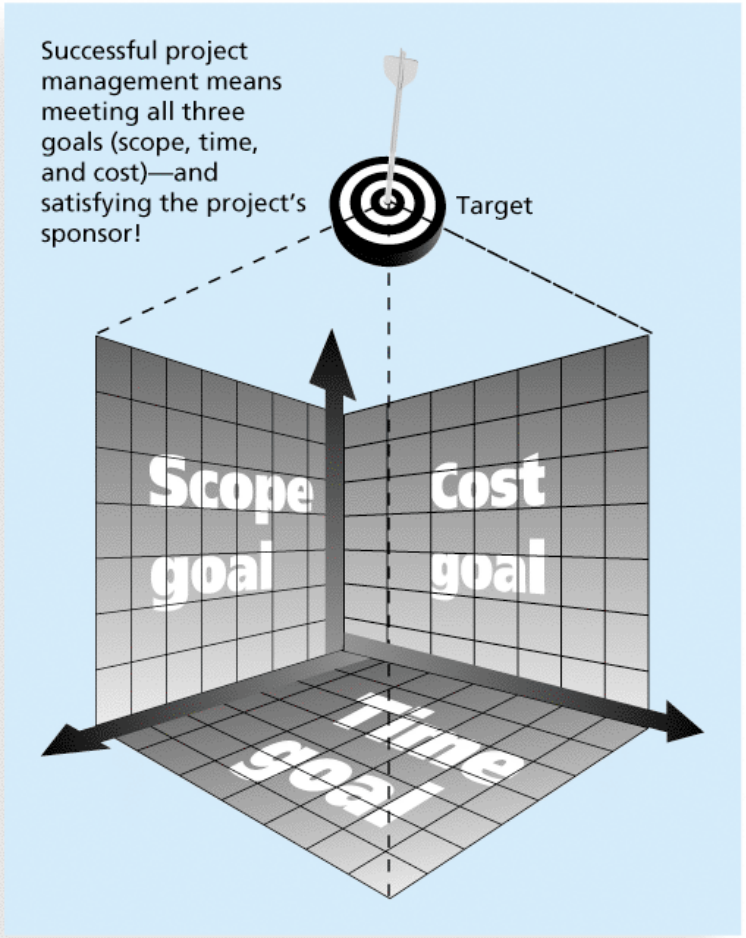
- **Project managers** work with project sponsors, project team, and other people involved in a project to meet project goals
- **Program managers** oversee programs; often act as bosses for project managers
- **Portfolio managers** coordinate various programs in order to ensure that things stay on track and that the organization is meeting its overarching strategic initiatives.

What is Project Management?

- **Project management** is “the application of knowledge, skills, tools and techniques to project activities to meet project requirements” (PMBOK® Guide)

- Project managers strive to meet the **triple constraint** (project scope, time, and cost goals) and also facilitate the entire process to meet the needs and expectations of project stakeholders

The Triple Constraint of Project Management



Quality too ????

Project Management vs Portfolio Management

Project Stakeholders

- **Stakeholders** are the people involved in or affected by project activities

- Stakeholders might include:
  - the project sponsor
  - the project manager
  - the project team
  - support staff
  - customers
  - users
  - suppliers
  - opponents to the project
  - competitors

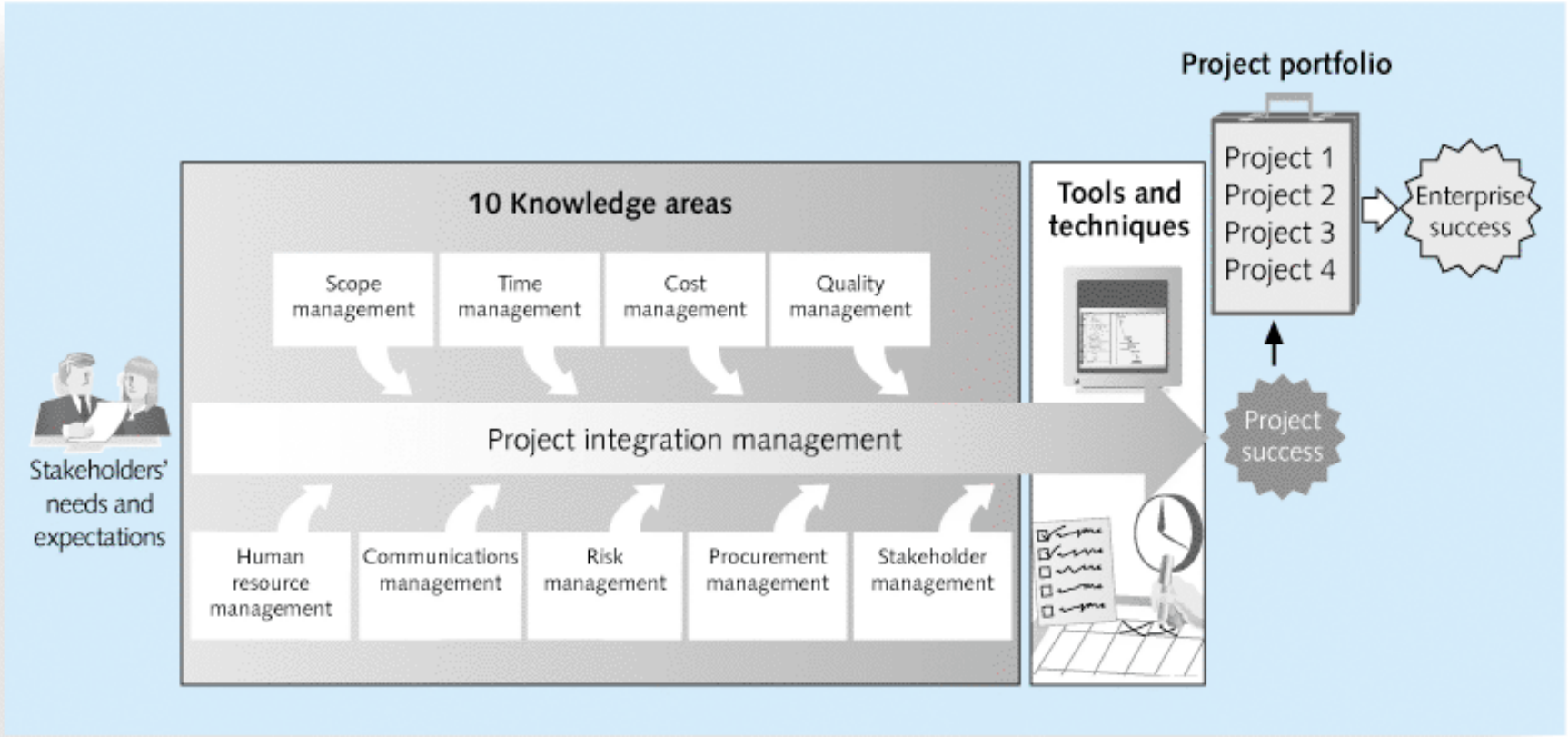
PMI's 10 Project Management Knowledge Areas

- **Knowledge areas** describe the key competencies that project managers must develop

- Project managers must have knowledge and skills in all 10 knowledge areas (project integration, scope, time, cost, quality, human resource, communications, risk, procurement, and stakeholder management)

- We would strive to each of the knowledge areas in this course

Project Management Framework

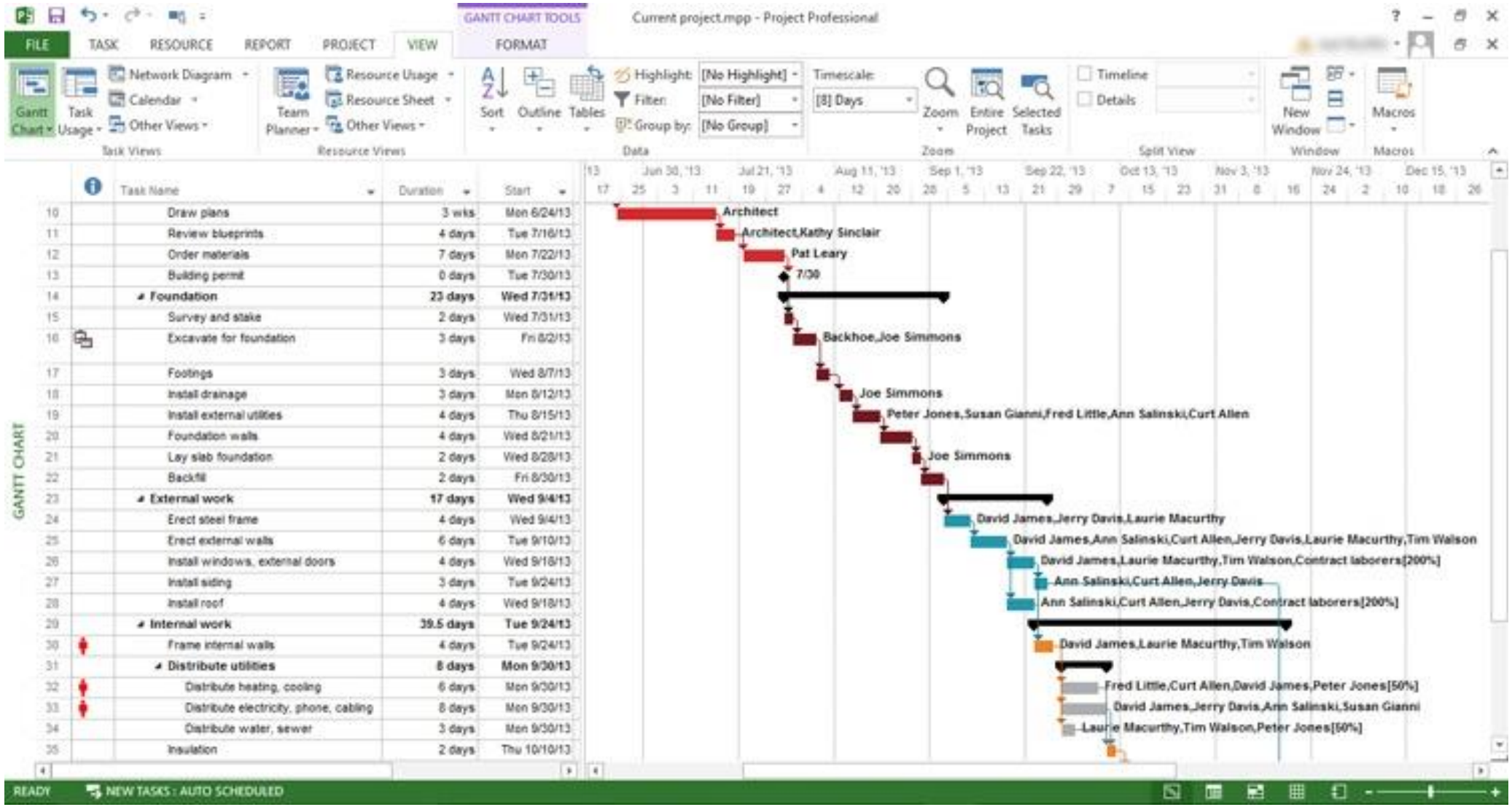


Project Management Tools and Techniques

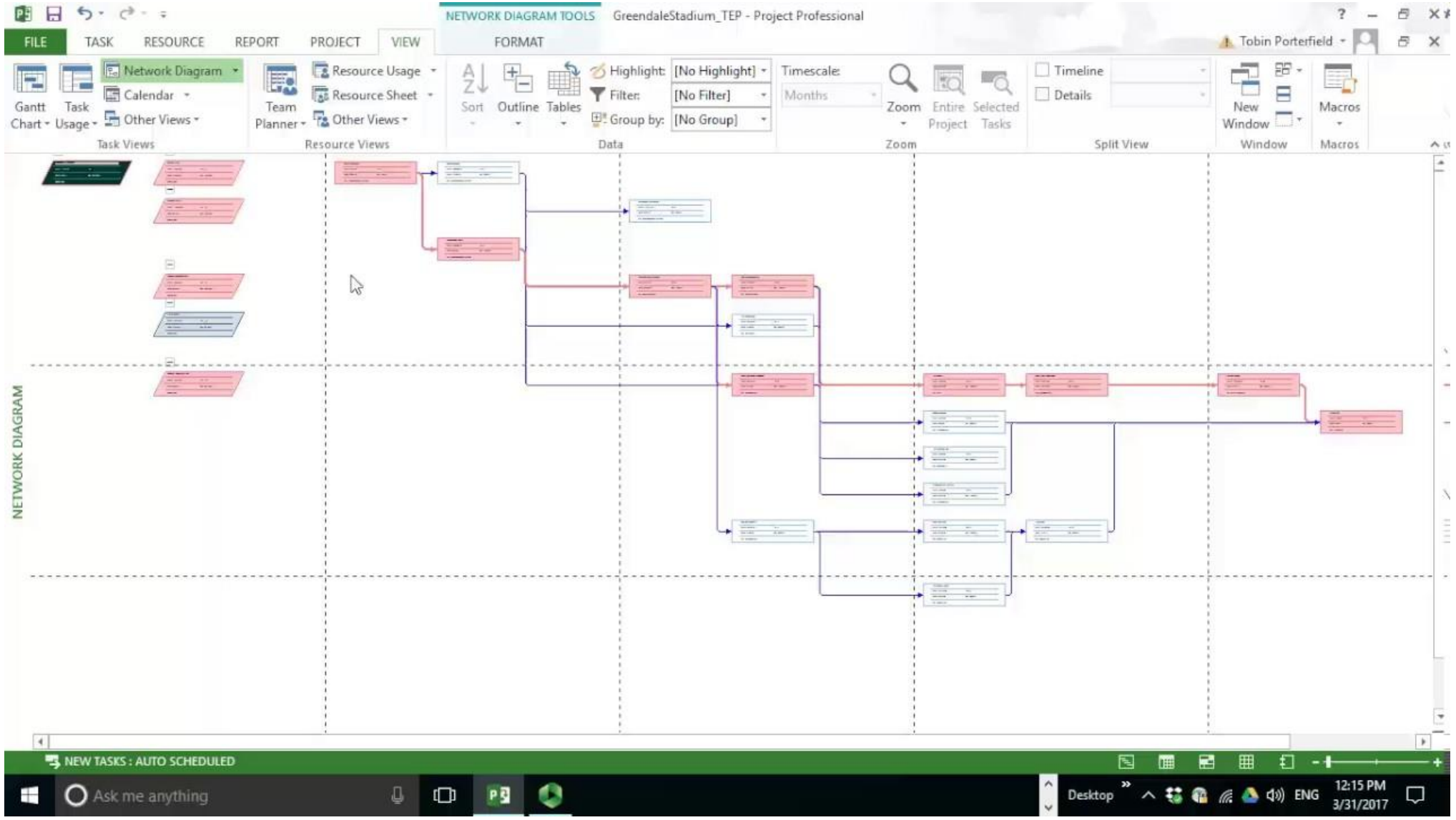
- **Project management tools and techniques** assist project managers and their teams in various aspects of project management.

- Some specific ones include
  - Project charter, scope statement, and WBS (scope)
  - Gantt charts, network diagrams, critical path analysis, critical chain scheduling (time)
  - Cost estimates and earned value management (cost)
  - MS Projects, JIRA

Sample Gantt Chart Created with MS Project



Sample Network Diagram Created with MS Project



The Project Manager

The Role of the Project Manager

- Job descriptions vary, but most include responsibilities such as planning, scheduling, coordinating, and working with people to achieve project goals
- Remember that 97% of successful projects were led by experienced project managers, who can often help influence success factors

Suggested Skills for Project Managers

- The Project Management Body of Knowledge
- Application area knowledge, standards, and regulations
- Project environment knowledge
- General management knowledge and skills
- Soft skills or human relations skills

Ten Most Important Skills and Competencies for PMs

1. People skills – soft skills
2. Leadership
3. Listening
4. Integrity, ethical behavior, consistent
5. Strong at building trust
6. Verbal communication
7. Strong at building teams
8. Conflict resolution, conflict management
9. Critical thinking, problem solving … criticism happens
10. Understands, balances priorities

Situational Skills

- **Large projects**: Leadership, relevant prior experience, planning, people skills, verbal communication, and team-building skills were most important
- **High uncertainty projects**: Risk management, expectation management, leadership, people skills, and planning skills were most important
- **Very novel projects**: Leadership, people skills, having vision and goals, self confidence, expectations management, and listening skills were most important

Importance of Leadership Skills

- Effective project managers provide leadership by example
- A **leader** focuses on long-term goals and big-picture objectives while inspiring people to reach those goals
- A **manager** deals with the day-to-day details of meeting specific goals
- Project managers often take on the role of both leader and manager

Careers for IT Project Managers

- Top / in demand IT skills of the last decade include:
  - Programming, project management, devOps, systems & networking, security, data analysis, AI/machine learning etc.

- PM has consistently remained and is even stronger now with Agile approach.

- Even if you choose to stay in a technical role, you still need project management knowledge and skills to help your team and organization

The IT Project Management Profession

- The profession of project management is growing at a very rapid pace.

- It is helpful to understand the history of the field, the role of professional societies like the Project Management Institute, and the growth in project management software

History of Project Management

- Some people argue that building the Egyptian pyramids was a project, as was building the Great Wall of China
- Most people consider the ***Manhattan Project*** to be the first project to use "modern" project management
  - This three-year, $2 billion (in 1946 dollars) project is said to have had a separate project manager and a technical manager

Project Management Offices

- In the 100s, many companies began creating PMOs to help them handle the increasing number and complexity of projects

- A **Project Management Office (PMO)** is an organizational group responsible for coordinating the project management function throughout an organization

Global Issues

- Several global dynamics are forcing organizations to rethink their practices:
  - Talent development for project and program managers is a top concern
  - Good project portfolio management is crucial in tight economic conditions
  - Basic project management techniques are core competencies
  - Organizations want to use more agile approaches to manage projects
  - Benefits realization of projects is a key metric

The Project Management Institute

- The Project Management Institute (PMI) is an international professional society for project managers founded in 1969.
- PMI has continued to attract and retain members, reporting almost 700,000 members worldwide as of 2022.
- There are communities of practices in many areas, like information systems, financial services, and health care.
- Project management research and certification programs continue to grow.
- Students can join PMI at a reduced fee and earn the Certified Associate in Project Management (CAPM) certification (see www.pmi.org for details)

PMI PM Certifications

PMI provides several certifications including:

- Project Management Professional (PMP)
- Certified Associate in Project Management (CAPM)
- Program Management Professional (PgMP)
- Portfolio Management Professional (PfMP)
- PMI Risk Management Professional (PMI-RMP)
- PMI Scheduling Professional (PMI-SP)
- PMI Professional in Business Analysis (PMI-PBA)
- PMI Project Management Ready
- Disciplined Agile Scrum Master (DASM) Certification
- PMI Agile Certified Practitioner (PMI-ACP)® Certification
- Disciplined Agile Senior Scrum Master (DASSM) Certification
- Disciplined Agile Value Stream Consultant (DAVSC) Certification
- Disciplined Agile Coach (DAC) Certification

https://www.pmi.org/certifications

Some PM Certifications

- **Scrum**
  - Professional Scrum Master
  - Professional Scrum Product Owner
  - Professional Scrum Development
  - Scaled Professional Scrum
  - Professional Scrum + User Experience
  - Professional Scrum + Kanban
- **Lean-Six Sigma**
  - White Belt
  - Yellow Belt
  - Green Belt
  - Black Belt
- **PRINCE2** (PRojects IN Controlled Environments)
  - Prince2 Foundation
  - Prince2 Practitioner
  - Prince2 Agile Foundation
  - Prince2 Agile Practitioner

Ethics in Project Management

- **Ethics**, loosely defined, is a set of principles that guide our decision making based on personal values of what is “right” and “wrong”
- Project managers often face ethical dilemmas
- In order to earn PMP certification, applicants must agree to PMI’s Code of Ethics and Professional Conduct
- Several questions on the PMP exam are related to professional responsibility, including ethics

Project Management Software

- There are hundreds of different products to assist in performing project management
- Three main categories of tools:
  - Low-end tools: Handle single or smaller projects well, cost under $200 per user. Monday.com
  - Midrange tools: Handle multiple projects and users, cost $200-$1,000 per user, MS Project is a popular example
  - High-end tools: Also called enterprise project management software, often licensed on a per-user basis
- Several free or open-source tools are also available

Chapter Summary

- A project is a temporary endeavor undertaken to create a unique product, service, or result.
- Project management is the application of knowledge, skills, tools, and techniques to project activities to meet project requirements.
- A program is a group of related projects managed in a coordinated way.
- Project portfolio management involves organizing and managing projects and programs as a portfolio of investments.
- Project managers play a key role in helping projects and organizations succeed.
- The project management profession continues to grow and mature.

Lecture IV

An Interesting Read

CHAOS Manifesto 2013: Think Big, Act Small

https://www.immagic.com/eLibrary/ARCHIVES/GENERAL/GENREF/S130301C.pdf

What Went Right? Improved Project Performance

- The Standish Group's CHAOS studies show improvements in IT projects in the past decade:
  - The number of successful IT projects has more than doubled, from 16 percent in 1994 to 39 percent in 2012
  - The number of failed projects decreased from 31 percent in 1994 to 18 percent in 2012
  - Success rates were much higher for small projects than large ones – 76 percent versus 10 percent

Project Success

- There are several ways to define project success:
  - The project met scope, time, and cost goals.
  - The project satisfied the customer/sponsor
  - The results of the project met its main objective, such as making or saving a certain amount of money, providing a good return on investment, or simply making the sponsors happy.

What Helps Projects Succeed?*

1. Executive support
2. User involvement
3. Clear business objectives
4. Emotional maturity ... willingness to throwaway prototypes?
5. Optimizing scope
6. Agile process
7. Project management expertise
8. Skilled resources
9. Execution
10. Tools and infrastructure

*The Standish Group, "CHAOS Manifesto 2013: Think Big, Act Small" (2013).

What Winners do…

- Recent research findings show that companies that excel in project delivery capability:
  - Use an integrated project management toolbox (use standard/advanced PM tools, lots of templates)
  - Grow project leaders, emphasizing business and soft skills
  - Develop a streamlined project delivery process
  - Measure project health using metrics, like customer satisfaction or return on investment

Best Practice

- A **best practice** is “an optimal way recognized by industry to achieve a stated goal or objective”.*
  - Make sure your projects are driven by your strategy. Be able to demonstrate how each project undertaken fits the business’ strategy, and screen out unwanted projects as soon as possible.
  - Stakeholder engagement. Ignoring stakeholders often leads to project failure. Be sure to engage stakeholders at all stages of a project, and encourage teamwork and commitment at all times.

*Project Management Institute, *Organizational Project Management Maturity Model (OPM3) Knowledge Foundation (2003), p. 13.*