

Analysis & Design of Information Systems

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A word cloud in the top-left corner containing terms like 'SYSTEMS', 'ANALYSIS', 'MODELING', 'DESIGN', 'EXPERTISE', 'DEVELOPMENT', 'MANAGEMENT', 'INFORMATION', 'TECHNOLOGY', 'SOFTWARE', 'HARDWARE', 'NETWORK', 'SECURITY', 'COMPLIANCE', 'RISK', 'QUALITY', 'PERFORMANCE', 'USABILITY', 'ACCESSIBILITY', 'INTEGRATION', 'SCALABILITY', 'FLEXIBILITY', 'PORTABILITY', 'RELIABILITY', 'AVAILABILITY', 'CONFIDENTIALITY', 'INTEGRITY', 'AUTHENTICITY', 'NON-REPUDIATION', 'ACCOUNTABILITY', 'TRANSPARENCY', 'ETHICALITY', 'SUSTAINABILITY', 'RESILIENCE', 'AGILITY', 'INNOVATION', 'CREATIVITY', 'CURIOSITY', 'EMPATHY', 'EMOTIONAL INTELLIGENCE', 'SOCIAL INTELLIGENCE', 'CULTURAL INTELLIGENCE', 'NATURAL INTELLIGENCE', 'ARTIFICIAL INTELLIGENCE', 'COGNITIVE INTELLIGENCE', 'EMOTIONAL INTELLIGENCE', 'SOCIAL INTELLIGENCE', 'CULTURAL INTELLIGENCE', 'NATURAL INTELLIGENCE', 'ARTIFICIAL INTELLIGENCE', 'COGNITIVE INTELLIGENCE'.

Objectives

- Memahami konsep suatu sistem dan bagaimana memodelkannya.
- Menjelaskan secara singkat proses sederhana untuk mengembangkan sistem informasi.
- Mengetahui SDLC secara umum.
- Mengetahui kegiatan analisis sistem.
- Mengetahui kegiatan desain sistem.
- Peran dan keahlian seorang *System Analyst*.

Agenda

- Objectives & Agenda
- Lecturer's Info
- Unit Lessons
- Course Sources
- Assessment Components
- Rules
- Assessment Scores
- A&DS Definition
- Core Concepts
- Data Process
- Information Systems
- SDLC
- System Analysis & Design
- System Analyst

Lecturer's Info

Name	Leon Andretti Abdillah		
Position	Associate Professor (Lektor Kepala) Editor and Reviewer of Scientific Journals (AJIS, BIT, CommIT, ComTech, INKOM, IJASEIT, IJSKD, KSII, SISFO, etc.) Editor and Reviewer of Scientific Conferences (CITSM, ICAITI, ICIBA, iCLICK, SOSEIC, SEMNASTIK, SEMAGMA, SHaP-SITI, SENTIKOM, SEMNASPOR, etc.) Mendeley Advisor, Almetric Ambassador Former Intellectual Property Center, Quality Assurance		
Faculty	Computer Science (Ilmu Komputer)		
Department (Study Program)	Information Systems (Sistem Informasi)		
Courses	1. Algorithms and Data Structures 2. Algorithms & Programming 3. Business Modeling – Supply Chain Management (BM-SCM) 4. Business Process Capital Management (BPCM) 5. Corporate IS Management Lanjut 6. Customer Relationship Management (CRM) 7. Data Structures and Algorithms 8. Database 9. Enterprise Application Integration (EAI) 10. Enterprise Resource Planning – Finance (ERPF)	10. Human-Computer Interaction (HCI) 11. Human Resource Information Systems (HRIS) 12. Knowledge Management Systems (KMS) 13. Object Oriented Programming (OOP) 14. Perancangan Sistem Informasi Industri & Enterprise Resource Planning (PSII&ERP) 15. Programming Concepts 16. Research Methods 17. Systems Analysis and Design (SA&D) 18. Supply Chain Management (SCM) 19. <u>Analysis & Design System (A&DS)</u>	

Unit Lessons

- Satuan Acara Perkuliahan (SAP)

- | | |
|--|--|
| 1. Introduction | 3. PART THREE DESIGN PHASE |
| 2. PART ONE PLANNING PHASE | <ul style="list-style-type: none"> a) Moving Into Design b) Architecture Design c) User Interface Design d) Program Design e) Data Storage Design |
| <ul style="list-style-type: none"> a) The Systems Analyst and Information Systems Development b) Project Selection and Management | 4. PART FOUR IMPLEMENTATION PHASE |
| 3. PART TWO ANALYSIS PHASE | <ul style="list-style-type: none"> a) Moving Into Implementation b) Transition To The New System c) The Movement To Objects |
| <ul style="list-style-type: none"> a) Requirements Determination b) Use Case Analysis c) Process Modeling d) Data Modeling | 5. Presentations |
| | 6. Exams |

Course Sources

- blog.binadarma.ac.id/mleonaa → Teaching | System Analysis & Design
- elearning.binadarma.ac.id
- leonabdillah.wordpress.com | Teaching | System Analysis & Design
- Facebook → System Analysis & Design

Assessment Components

- Class activities 15% [Questionnaire + Attendance]
- Middle exam 20% [MidTest]
- Reports 25% [Assignments + Presentation]
- Final exam 40% [FinalTest]
- Total 100%

Course Rules

- Every student must enrolls or registers, shown by KRS 
- Attendance $\geq 80\%$ of 16weeks [13x]
- Late tolerance /meeting = 15 minutes
- Keep your mobile devices silent all the time in the class
- Keep your volume silent all the time in the class 
- Casual uniform for daily class 
- At final exam, each student must wear white shirt and black



Rating Scores

Score Penilaian

No.	Total Score	Nilai	Bobot
1	085 – 100	A	4
2	070 – 084	B	3
3	055 – 069	C	2
4	040 – 054	D	1
5	000 - 039	E	0

5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
																A	A	A	A
													B	B	B				
										C	C	C							
							D	D	D										
E	E	E	E	E	E	E													



Core Concepts Preview

- **Data**
 - Raw facts (fakta-fakta mentah) such as an employee's name and number of hours worked in a week, inventory part numbers or sales orders.
- **Information**
 - A collection of facts organized in such a way that they have additional value beyond the value of the facts themselves.
- **Information Systems**
 - The collections of elements that processing data into information for specific purposes

Data Processing



Data

\$35,000 12 Units \$12,000
J. Jones Western Region
\$100,000 100 Units
35 Units

Data Processing

Information

Salesperson: J. Jones Sales
Territory: Western Region
Current Sales: 147 Units =
\$147,000

Data Processes

- The types of basic process are (Curtis and Cobham, 2004):
 - classification of data;
 - rearranging/sorting data;
 - summarizing/aggregating data;
 - performing calculations on data;
 - selection of data.

- Management information system (MIS) is a computer-based system that makes information available to users with similar needs (McLeod & Schell, 2007).
- An **information system** (IS) can be any organized combination of people, hardware, software, communications networks, data resources, and policies and procedures that stores, retrieves, transforms, and disseminates information in an organization (O'Brien & Marakas, 2011).
- An **information system** combines information technology, people, and data to support business requirements (Shelly & Rosenblatt, 2012).

A word cloud graphic in the top-left corner, featuring terms like 'SYSTEMS', 'ANALYSIS', 'DESIGN', 'MODELING', 'DEVELOPMENT', 'MANAGEMENT', 'EXPERTISE', 'INFORMATION', 'TECHNOLOGY', 'BUSINESS', 'PROCESS', 'DATA', 'PRODUCTS', 'KNOWLEDGE', 'DIGITAL', 'INTEGRATED', 'COMPONENTS', 'COLLECTING', 'STORING', 'PROCESSING', 'PROVIDING', 'TASKS', 'BUSINESS', 'NEEDED', 'COMPLETE', 'INTERRELATED', 'COMPONENTS', 'COLLECT', 'PROCESS', 'STORE', 'PROVIDE', 'OUTPUT', 'INFORMATION', 'NEEDED', 'COMPLETE', 'BUSINESS', 'TASKS'.

Information Systems [2/2]

- **Information system**, an integrated set of components for collecting, storing, and processing data and for providing information, knowledge, and digital products (Zwass, 2016).
- An **information system** is a set of interrelated components that collect, process, store, and provide as output the information needed to complete business tasks (Satzinger, Jackson & Burd, 2016).

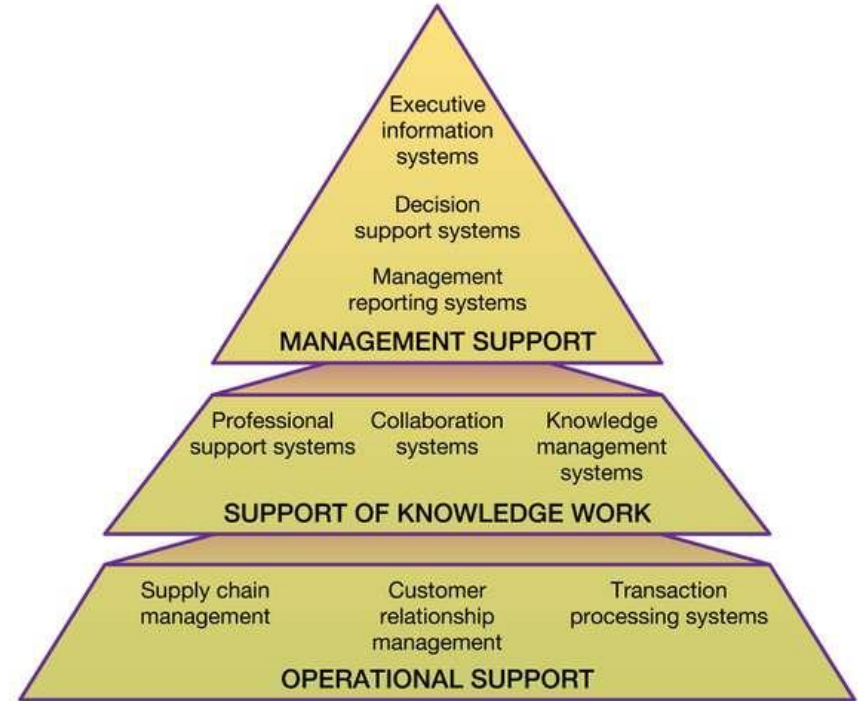
Information Technology

- **Information technology (IT)** refers to the combination of hardware, software, and services that people use to manage, communicate, and share information.
- More than ever, business success depends on information technology.
- IT is driving a new digital economy, where advances in hardware, software, and connectivity can provide enormous benefits to businesses and individuals.

(Shelly & Rosenblatt, 2012)

Information Systems Types

- At least 3 (three) layers of IS (Zwass, 2016):
 - Management Support
 - Support of Knowledge Work
 - Operational Support



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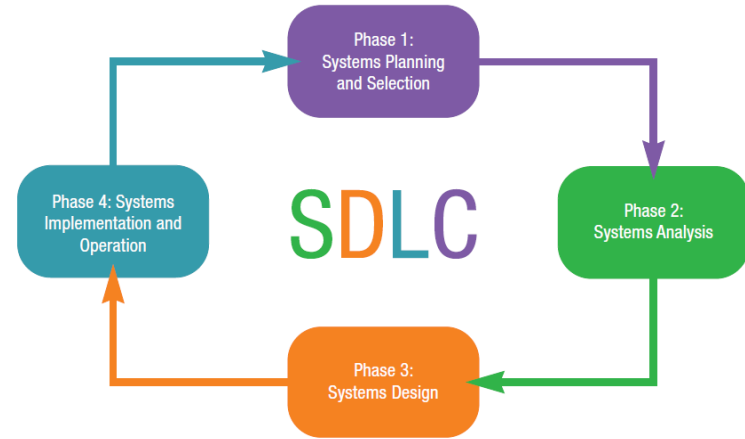


The Systems Development Life Cycle (SDLC) – 4 Phases [1/2]

- The *systems development life cycle (SDLC)* is the process of understanding how an information system (IS) can support business needs by designing a system, building it, and delivering it to users (Dennis, 2015).

The Systems Development Life Cycle (SDLC) – 4 Phases [2/2]

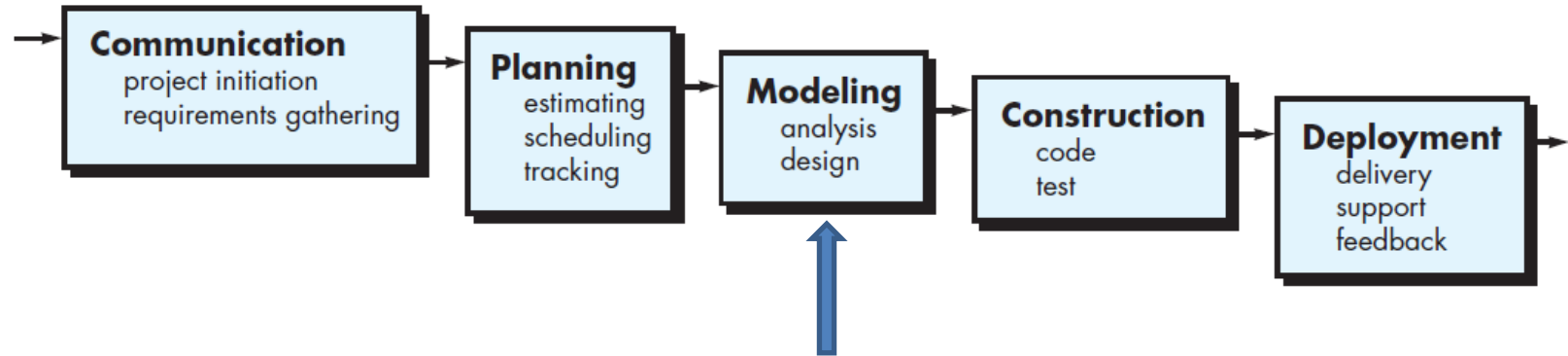
- The four steps of the systems development life cycle (SDLC):
 1. Planning and selection,
 2. Analysis,
 3. Design, and
 4. Implementation and operation.



(Valacich, George & Hoffer, 2015)

The Systems Development Life Cycle (SDLC) – 5 Phases

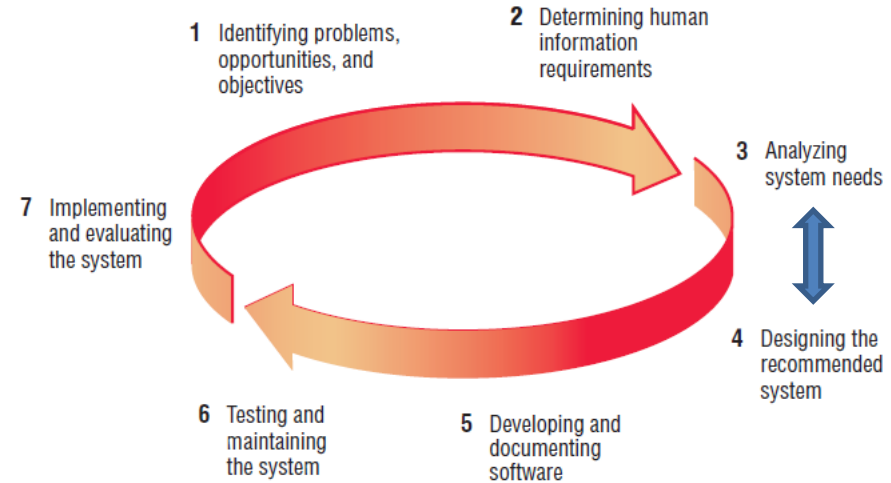
- Waterfall Model
 - The waterfall model, sometimes called the classic life cycle (Pressman & Maxim, 2015), suggests a systematic, sequential approach to software development



The Systems Development Life Cycle (SDLC) – 7 Phases

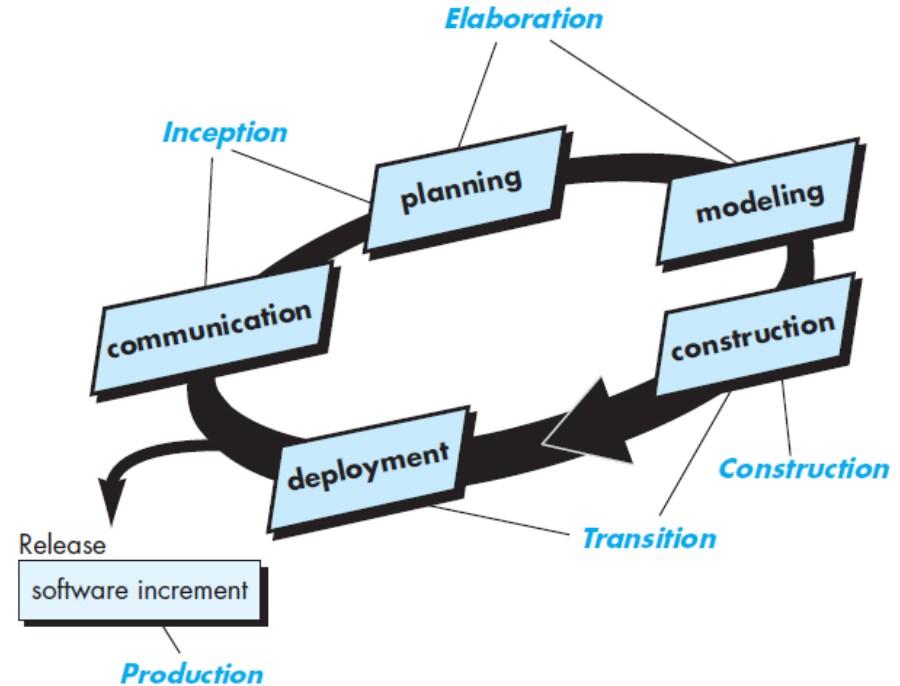
- The seven phases of the systems development life cycle (SDLC).
 1. Identifying problems
 2. Determining human information requirements
 - 3. Analyzing systems needs**
 - 4. Designing the recommended system**
 5. Developing and documenting software
 6. Testing and maintaining the system
 7. Implementing and evaluating the system

(Kendall & Kendall, 2014)



Unified Process (UP)

- Unified Process (Wazlawick, 2014) is heavily based (although not necessarily) on unified modeling language (UML). The 4 (four) major UP phases: Inception, Elaboration, Construction, and Transition.
- By 1997, UML became a de facto industry standard for object-oriented software development (Pressman, 2015).

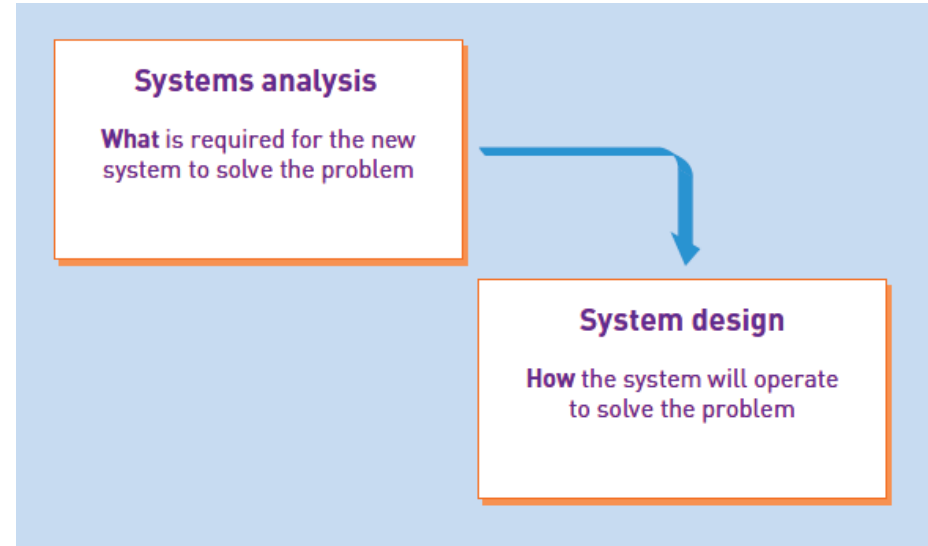


Need for Systems Analysis and Design

- The lifecycle of development inevitably affects the way analysis and design are accomplished (Langer, 2008).
- Systems analysis and design, as performed by systems analysts, seeks to understand what humans need to analyze data input or data flow systematically, process or transform data, store data, and output information in the context of a particular organization or enterprise (Kendall, 2014).
- The main goal of systems analysis and design is to improve organizational systems, typically through applying software that can help employees accomplish key business tasks more easily and efficiently (Valacich, George & Hoffer, 2015).

System Analysis vs System Design

- **Systems analysis** consists of those activities that enable a person to understand and specify what the new system should accomplish.
- **Systems design** consists of those activities that enable a person to describe in detail how the information system will actually be implemented to provide the needed solution.



(Satzinger, Jackson & Burd, 2016)

- Systems analyst (Whitten & Bentley, 2007):
 - understand both business and computing.
 - initiate change within an organization.
 - is basically a problem solver.

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Typical Systems Analyst Skills

- Project members are *change agents* who needs a variety of skills. These skills can be broken down into 6 (six) major categories (Dennis, Wixom & Tegarden, 2015):
 1. technical,
 2. business,
 3. analytical,
 4. interpersonal,
 5. management, and
 6. ethical.

Conclusions

- Basic concepts: Data, Information, Information Technology, Information Systems
- The 2 (two) most common phases in software development are **Analysis** and **Design**
- Person in charge with that matters is **System Analyst**
- A good System Analyst required some skills

Assignments

1. Prepare your SocialMedia ID (**FaceBook**)
2. Set a **group discussion** consist of 2-4 students for small class (≤ 20), 5-6 students for medium class (21-35), or 7-8 students for large class (> 36)
3. Prepare your blog using **WordPress**, create a page/laman “SA&D” or “Systems Analysis and Design” or “A&PS” or “Analisis dan Perancangan Sistem”
4. Create an account in Cloud repository (**DropBox**)
5. Develop your **team project theme** based on the information given from several sources (journals, conference proceedings, books, or master theses). You may use one of these sources: a) GOOGLE SCHOLAR (<http://scholar.google.com/>) or b) MICROSOFT ACADEMIC SEARCH (<http://academic.research.microsoft.com/>)

References

- Abdillah, L. A. (2003). *Sistem Basis Data Lanjut I: Membangun Sistem Basis Data*. Palembang: Pusat Penerbitan dan Percetakan Universitas Bina Darma.
- Abdillah, L. A. (2006). Perancangan basisdata sistem informasi penggajian. *Jurnal Ilmiah Matrik*, 8(2), 135-152.
- Abdillah, L. A. (2015). Database. Retrieved from <http://blog.binadarma.ac.id/mleonaa/teaching/database/>
- Abdillah, L. A. (2016). Systems Analysis and Design. *Computer Science for Education*. from <http://blog.binadarma.ac.id/mleonaa/teaching/systems-analysis-and-design/>
- Abdillah, L. A. (2018). Human Computer Interaction. *Computer Science & Information Systems*. from <https://leonabdillah.wordpress.com/teaching/human-computer-interaction-hci/>
- Curtis, G., & Cobham, D. (2004). Business Information Systems: Analysis, Design and Practice. In *Journal of Vascular and Interventional Radiology* (5th ed., Vol. 18). Essex, England: Pearson Education Limited.
- Dennis, A., Wixom, B. H., & Roth, R. M. (2012). *Systems Analysis and Design* (5th ed.). Hoboken, New Jersey, USA: John Wiley & Sons, Inc.
- Dennis, A., Wixom, B. H., & Tegarden, D. (2015). *Systems Analysis & Design: An Object-Oriented Approach with UML* (5th ed.). Hoboken, New Jersey, USA: John Wiley & Sons, Inc.

Elmasri, R., & Navathe, S. (2011). *Fundamentals of database systems*: Addison-Wesley Publishing Company.

Kendall, K. E., & Kendall, J. E. (2014). *Systems Analysis and Design* (9th ed.). Upper Saddle River, New Jersey, USA: Pearson Education, Inc.

Langer, A. M. (2008). *Analysis and Design of Information Systems* (3 ed.). London, UK: Springer-Verlag London Limited.

McLeod, R., & Schell, G. P. (2007). *Management information systems* (10th ed.). New Delhi, India: Pearson Education, Inc. and Dorling Kindersley Publishing, Inc.

O'Brien, J. A., & Marakas, G. M. (2011). *Management Information Systems* (10th ed.). New York, USA: McGraw-Hill Companies, Inc.

Pressman, R. S., & Maxim, B. R. (2015). *Software Engineering: A Practitioner's Approach* (8 ed.). New York, USA: McGraw-Hill Education.

Satzinger, J. W., Jackson, R. B., & Burd, S. D. (2016). *Systems Analysis and Design in a Changing World* (7 ed.). Boston, MA, USA: Cengage Learning.

Shelly, G. B., & Rosenblatt, H. J. (2012). *Systems Analysis and Design* (9th ed.). Boston, MA, USA: Course Technology, Cengage Learning.

- Valacich, J. S., George, J. F., & Hoffer, J. A. (2015). *Essentials of Systems Analysis and Design* (6th ed.). Essex, England: Pearson Education Limited.
- Wazlawick, R. S. (2014). *Object-oriented analysis and design for information systems: modeling with UML, OCL, and IFML*. Waltham, MA, , USA: Morgan Kaufmann (Elsevier).
- Whitten, J. L., & Bentley, L. (2007). *Systems analysis and design methods* (7th ed.). New York, USA: The McGraw-Hill Companies, Inc.
- Zwass, V. (2016). Information system. *Encyclopædia Britannica*, from <https://www.britannica.com/topic/information-system>