Graduation Research
CSCI 4108

Introduction

Outline

- Group Formation
- Capstone Project
- Why research in IT Matters?
- Some Subject Areas
- Select a research topic
- Project types
- Project Idea assessment
- Problem Statement
- Roles and Duties

Reminder – Group Formation

1st Semester

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- Form Group, choose a topic & a supervisor.
- Project Proposal report: Abstract, Introduction, Problem Statement, Related Works, ….

2nd / summer Semester

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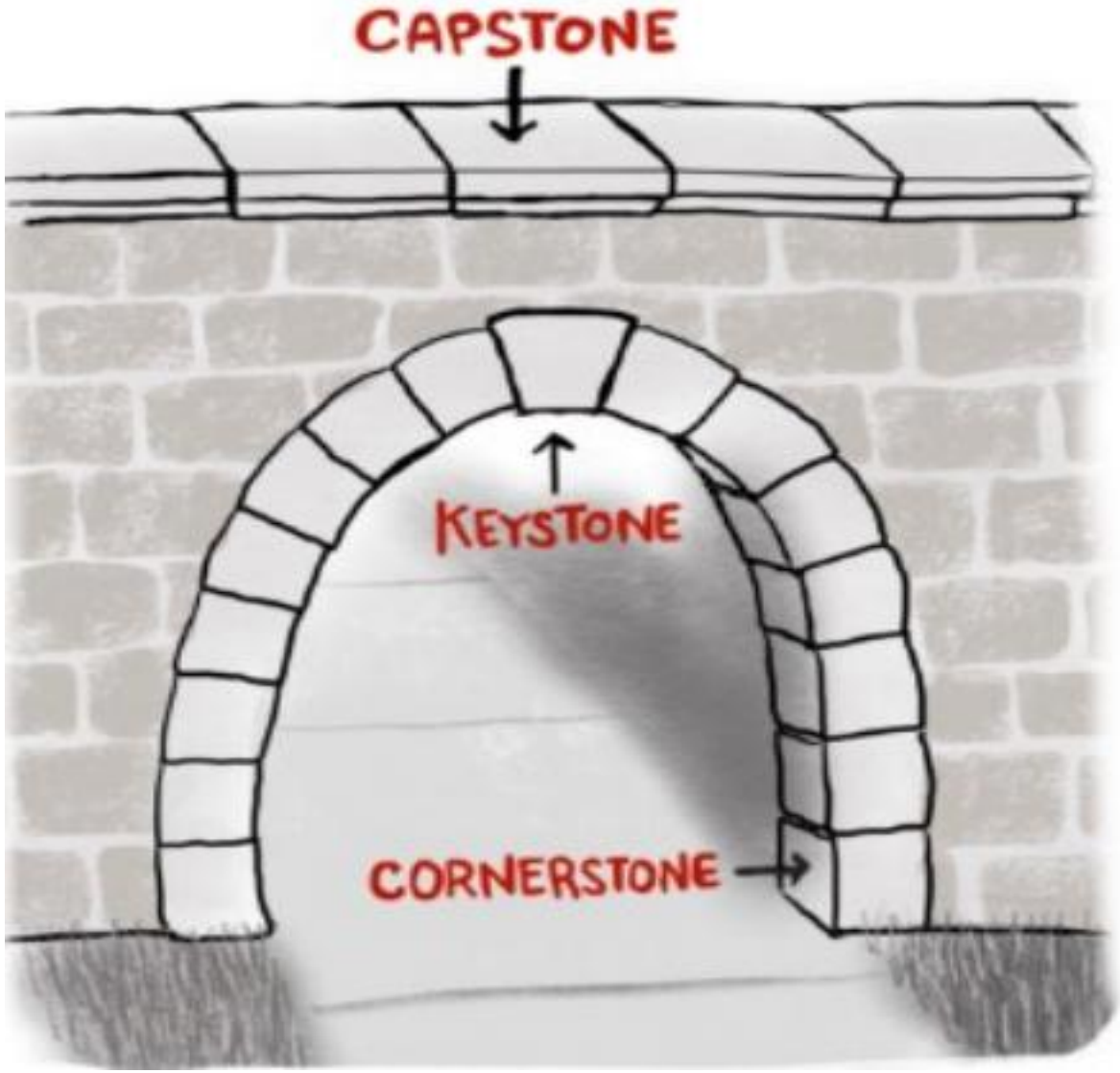
- Same Group, topic & supervisor.
- Implement Project + write “Graduation Report” (same as proposal + additional chapters and sections).

Capstone Project



Importance of graduation project

- Opportunity to demonstrate knowledge & skills you have acquired
  - Project Management
  - Analytical Skills – taking a complex problem and devising a practical solution
  - Communication Skills – preparation of web sites, reports and a presentation
- **The successful completion of graduation project is a sing of the students' readiness to pursue a professional career**

Pose questions and find information

What is research?

What is Research?

- Research is a systematic and organized process of inquiry, investigation, or exploration that is conducted to discover, interpret, analyze, and gain knowledge or insights into a specific topic, issue, question, or phenomenon.

Why Research in IT Matters?

Significance of research skills in the IT field.

- Advancements in technology rely on research.
- Research skills enhance problem-solving abilities.
- IT professionals with research skills are in high demand.

Importance of choosing the right research topic.

- Align with your interests and career goals.
- Contributes to the field of IT.

Why Research in IT Matters?

Driving Technological Advancements and make Innovation and Breakthroughs

Solving Real-World Complex Problems

Staying Competitive

Continuous Learning

Contribute…. – Business started by students at University

FedEx

Snapchat

Facebook

Google

reddit

VLC

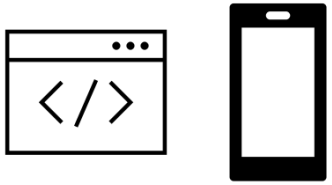
Dropbox

WordPress

Why Research in IT Matters? – the summary

- Research in IT matters because it drives technological progress, equips individuals with problem-solving skills, meets industry demands, ensures competitiveness, fosters continuous learning, leads to innovation, and addresses real-world challenges.
- It's a fundamental component of the Information Technology field and has a significant impact on both individuals and society.

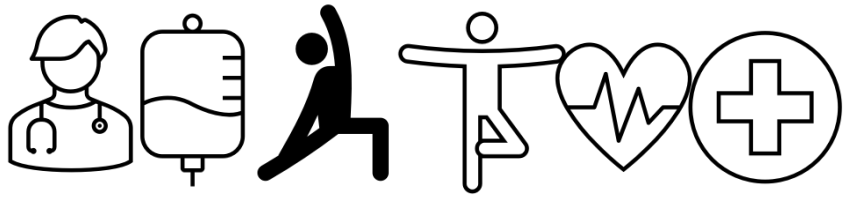
Subject Area



- Software Development:
  - Create a mobile app or web application to solve a specific problem or address a particular need.
  - Contribute to an open-source project by adding new features or fixing bugs.
  - Develop an AI-powered chatbot for customer support.
  - ….

- E-commerce and Online Business:
  - Develop an e-commerce website with advanced features like personalized recommendations and real-time inventory management.
  - Optimize the checkout process to reduce cart abandonment rates.
  - Create a business intelligence dashboard for tracking e-commerce metrics.
  - …

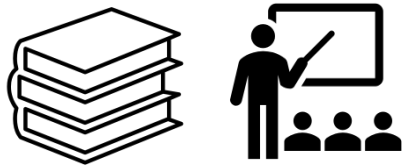
Subject Area



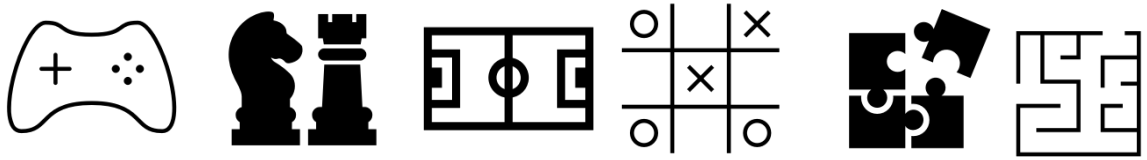
- Health IT:
  - Design and build a telemedicine platform for remote patient consultations.
  - Develop a healthcare data management system for electronic health records (EHR).
  - Implement a wearable device for health monitoring and data collection.
  - …

- AR / VR applications
  - Create a VR-based training application for a specific industry, like aviation, healthcare, or manufacturing, which includes 3D simulations, audio, and interactive elements for hands-on learning.
  - Build an AR mobile app that provides an immersive tourism experience. Users can point their smartphone or AR glasses at landmarks, and the app overlays multimedia information, historical facts, and virtual tour guides.
  - ….

Subject Area

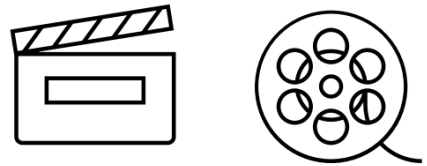


- Interactive Educational Website:
  - Develop an interactive educational website that uses multimedia elements such as videos, animations, and interactive quizzes to teach a specific subject, like coding, science, or history.
  - Use AR and VR in education
  - ….
- Video Game Development:

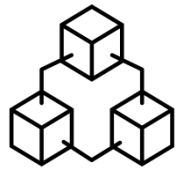


  - Develop a video game that incorporates multimedia elements, including 3D graphics, sound effects, and music. This could involve creating an original game or enhancing an existing one.
  - ….

Subject Area

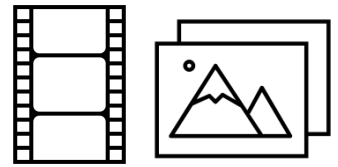


- Multimedia Documentary Project:
  - Create a multimedia documentary on a relevant and meaningful topic, combining video interviews, animations, infographics, and interactive elements to engage and inform viewers.
  - …

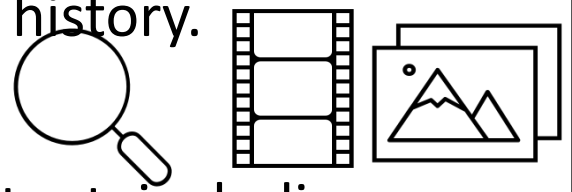


- Blockchain and Cryptocurrency:
  - Design and implement a blockchain-based supply chain management system.
  - Explore the use of blockchain for secure voting systems.
  - …

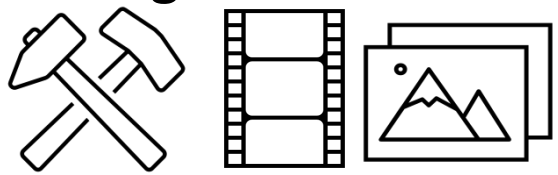
Subject Area



- Multimedia Content Recommendation System:
  - Develop a recommendation system that suggests multimedia content (videos, music, articles) to users based on their preferences and viewing history.



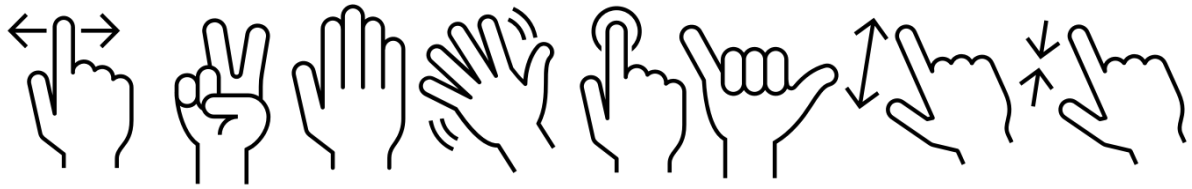
- Multimedia Search Engine:
  - Build a search engine that can index and search multimedia content, including images, videos, and audio clips, using advanced algorithms like image recognition and natural language processing.



- Multimedia Data Mining and Analysis:
  - Create a system that mines multimedia data (images, videos, social media content) to extract valuable insights, trends, or sentiment analysis for marketing or research purposes.

Subject Area

- Gesture Recognition and Control:



  - Design a system that uses computer vision and machine learning to recognize and interpret gestures, allowing users to control applications or devices through hand or body movements.
- ……

Selecting a Research Topic

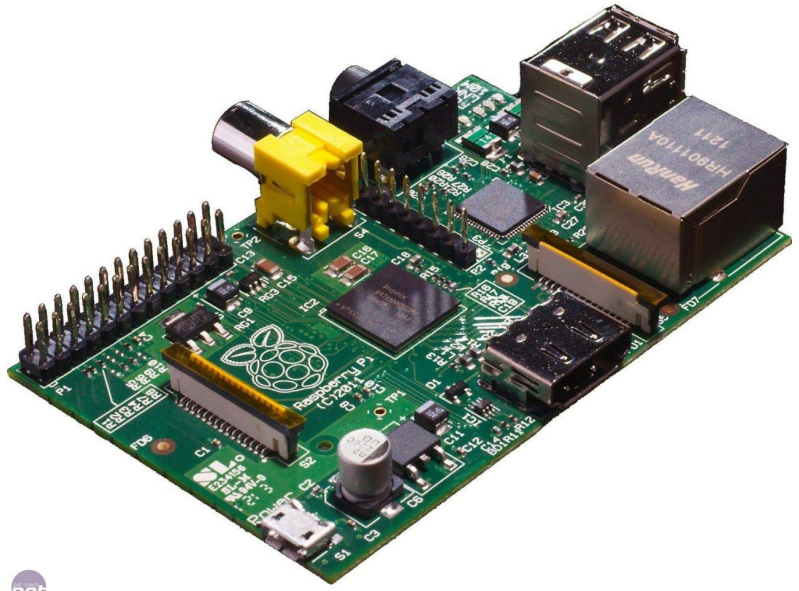
- Students (strongly encouraged)
  - Students are advised to discuss their own project idea with the faculty members in the college for potential supervision
- Faculty members
  - Based on their expertise, faculty members would propose several projects they are willing to supervise; Students may bid to join such projects
- External partners
  - Students may choose to work with our industry partners on their sponsored projects

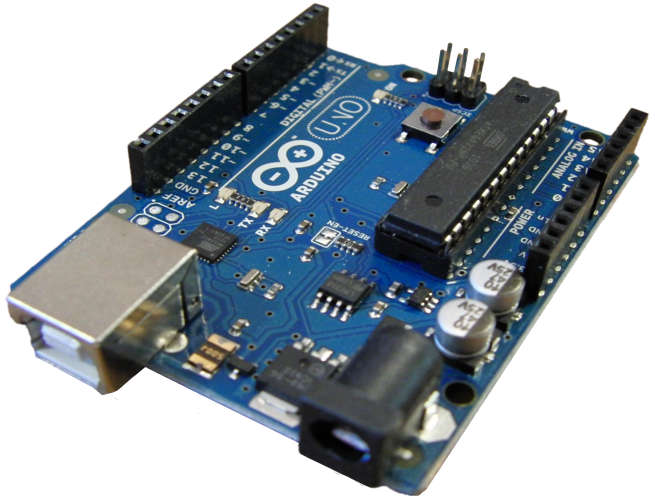
Project types

- Generic applications
- Customized application

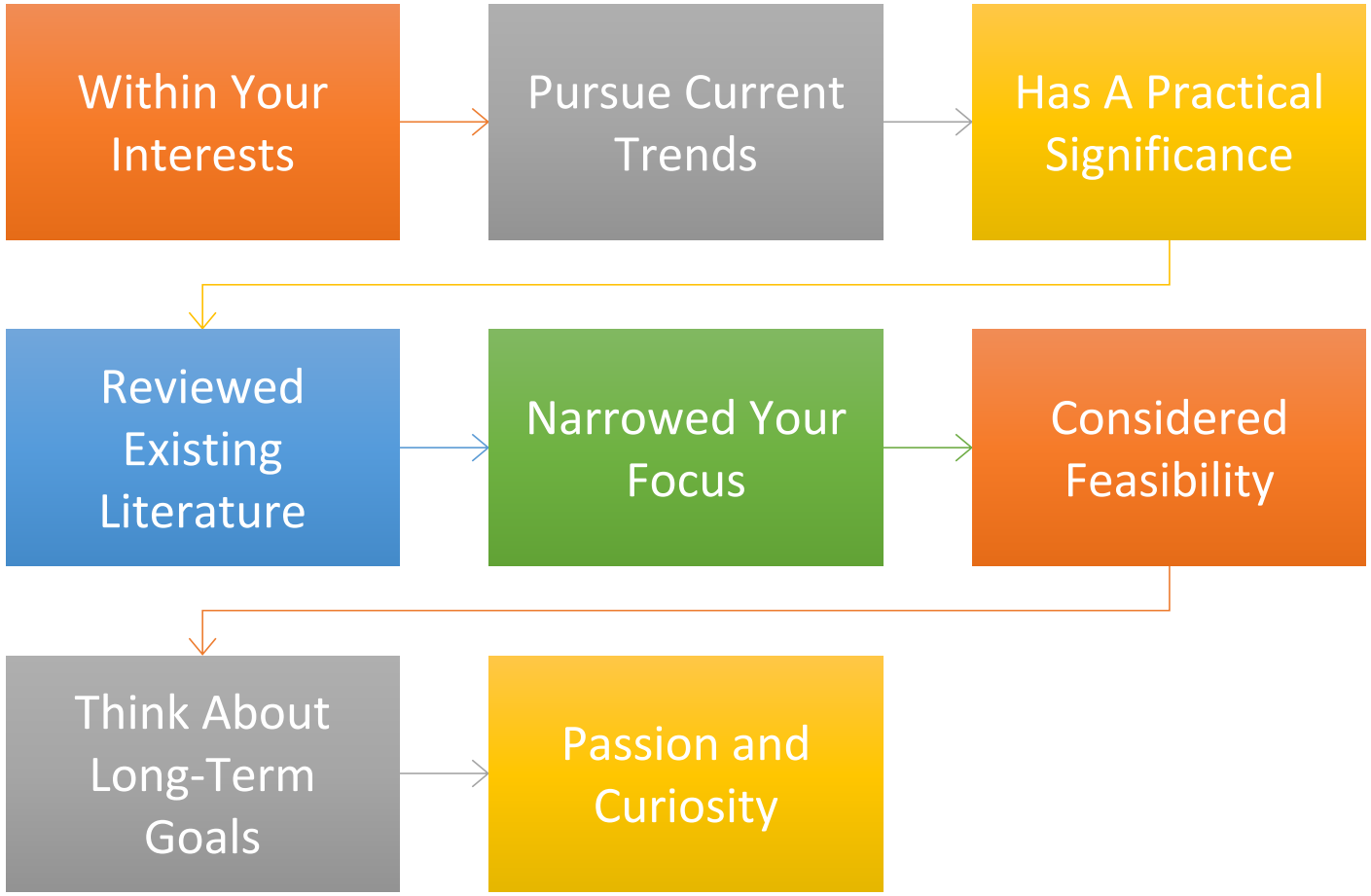
Target platform

- Desktop
- Mobile
- Web
- Raspberry Pi / Arduino





Project Idea Assessment



Ask for advice

Consult with Professors and Peers

Stay Open to Adaptations

Formulating a Research Problem

1. Start with a Broad Idea
2. Narrow Down the Focus
3. Consider the "5 Ws" and "H“
    1. Use the "5 Ws" (Who, What, Where, When, Why) and "H" (How) to guide your thinking.
    2. For example, "Who is affected by the problem? What is the nature of the problem? Where does it occur? When is it most prevalent? Why does it matter? How can it be addressed?"
4. Review Existing Literature

Formulating a Research Problem (Cont.)

5. Consider the Impact
6. Make It Specific and Clear
7. Articulate as a Question or Statement
8. Seek Feedback
9. Revise and Refine
10. Write a Problem Statement

Formulating a Research Problem (Cont.)

- Well-formulated research problem is the foundation of your research project.
- It guides your research design, data collection, analysis, and ultimately, the contribution your research makes to the field of IT.
- Take the time to craft a problem statement that is both meaningful and researchable.

Project Problem statement Examples

- Development of a Mobile Banking App
  - Problem Statement: "The current mobile banking apps lack essential features, leading to low user satisfaction and limited adoption. The project aims to develop a user-friendly and feature-rich mobile banking app that provides secure, convenient, and efficient banking services to customers.“
- Website Redesign for E-commerce Business
  - Problem Statement: “Company X e-commerce website is outdated, resulting in poor user experience and low conversion rates. The project seeks to redesign the website, incorporating modern design principles, optimizing for mobile devices, and enhancing the shopping and checkout process to increase sales."

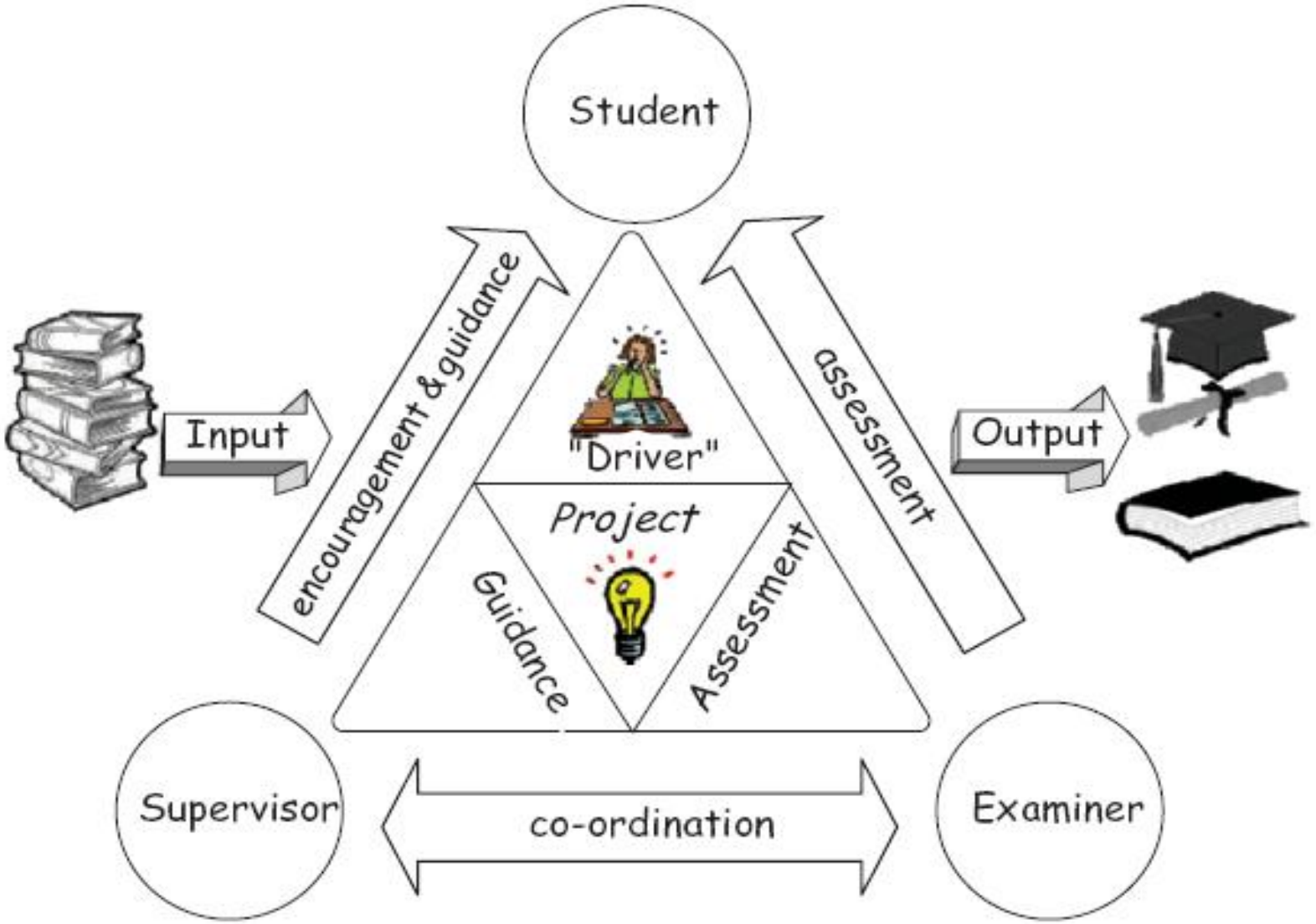
Project Problem statement Examples

- Implementation of an AI Chatbot for Customer Support
  - Problem Statement: “Company Y Customer support response times are slow due to a high volume of inquiries. This project aims to implement an AI-powered chatbot to handle routine customer inquiries, improve response times, and enhance customer satisfaction.“
- Fitness Tracking Mobile App
  - Problem Statement: "Existing fitness tracking apps lack personalized workout plans and nutrition guidance. The project's objective is to create a fitness tracking mobile app that offers tailored exercise routines, nutrition recommendations, and progress tracking to help users achieve their fitness goals."

Project Problem statement Examples

- Task Management Mobile App
  - Problem Statement: "Existing task management apps lack integration with popular productivity tools and often have limited collaboration features. The project seeks to create a task management mobile app that seamlessly integrates with popular productivity apps and enhances team collaboration and task organization."

Roles


Student
Input
encouragement & guidance
"Driver"
Project
Guidance
Assessment
assessment
Output
Supervisor
co-ordination
Examiner

Duties of a Supervisor

1. Asses the project's idea
2. Help you select a project idea.
3. Assess your progress through the project
4. Determine your suitability to continue
5. Guide your work.
6. Guide you in the preparation of your proposal and report.
7. Choose your examination committee.

Duties of students

1. Project Planning:
   - Define clear project goals and objectives.
   - Develop a project plan with a timeline and milestones.
   - Identify the scope of the project and any constraints.
2. Research and Literature Review:
   - Conduct thorough research on the chosen topic.
   - Review relevant literature and previous work in the field.
   - Identify gaps in existing knowledge that the project can address.
3. Proposal Development:
   - Create a project proposal outlining the problem statement, objectives, methodology, and expected outcomes.
   - Seek approval from the project advisor.

Duties of students

4. Team Collaboration:
   - Collaborate effectively with team members.
   - Divide tasks and responsibilities among team members.
   - Ensure clear communication within the team.
5. Development and Implementation:
   - Implement the solution.
   - Test and validate the implementation.
6. Documentation:
   - Maintain detailed project documentation, including research notes, code documentation, and design documents.
   - Create a comprehensive project report or thesis that outlines the project's methodology, results, and conclusions.

Duties of students

7. Presentation and Communication:
   - Prepare and deliver presentations to mentors, or evaluators to communicate project progress and findings.
   - Present the final project outcomes, conclusions, and recommendations clearly and effectively.
   - Discuss the project's significance and implications.
   - Respond to questions and feedback effectively.
8. Problem-Solving:
   - Address challenges and obstacles that arise during the project.
   - Adapt to changing circumstances or unexpected issues.
9. Time Management:
   - Manage time effectively to meet project deadlines and milestones.
   - Prioritize tasks and allocate time for research, development, and testing.

Duties of students

10. Adviser/Mentor Interaction:
    - Regularly communicate with the project adviser or mentor for guidance, feedback, and support.
    - Seek clarification on project-related questions or concerns.

Using your supervisor effectively

- Prepare for your meetings.
- What progress you have made since the last meeting
- What problems have you encountered?
- What do you intend to do next – is this suitable? Has your supervisor any other suggestions?