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Key Concepts Learned
<p>This week I explored Software Effort and Cost Estimation (COCOMO &amp; COCOMO II), Risk Management, and Configuration Management. These are all crucial notions to grasp to effectively execute a software project with expected timelines, finances, and expected pitfalls projected and hopefully avoided. Key effort estimation models are COCOMO and COCOMO II. They assist software projects with cost estimation and anticipated durations for completion. For instance, the fundamental COCOMO model is based on the complexity of the application, the expected familiarity developers will have with it, and the expected reliability of the system. COCOMO II expands upon that model to address any new variables that are determined during the development process, best for more incremental and Agile applications. The only foolproof way of never going over budget is to assess the cost drivers and appropriately use the formulas for optimal resource use and optimal time estimation. Risk management is the process of identifying and assessing project risks, be it a technical failure, a failure to comply, operational problems, etc. We covered how risks could be minimized risk avoidance, risk transfer, risk reduction, risk acceptance as well as a more formalized assessment of qualitative and quantitative factors that would render a project more viable. Using configuration management would have ensured knowledge of changes and versioning and what was planned for the future to keep everything consistent across the software products. The ability to implement configuration management would have lessened the chance for error upon deployment, ensured compliance, and stability of the system over time.</p>

Application in Real Projects
<p>Without effort estimation and risk management, professional software development is in trouble. Projects go over budget all the time because there's no estimation, and projects fail all the time because there's no risk management. For instance, many software development companies use the COCOMO II model for effort estimation, and further down the line for budgetary needs, it's required for acquired software especially enterprise solutions. In addition, many software development companies possess a risk assessment hierarchy to determine the feasibility of certain project risks as quickly as possible to avoid loss later and champion project success. We used COCOMO II to assess our development time for the AI-Driven Health Monitoring App due to our assessed difficulty of the AI model, number of anticipated integrations with anticipated healthcare APIs, and other cost drivers, such as team reliability and estimated budget. The benefit of being able to assess time using COCOMO II provided a lens into where time and energy would be most focused and created a feasible timeline. Furthermore, risk was assessed based upon step risks during AI model accuracy assessment, data privacy (GDPR and HIPAA), and expected downtimes. We assessed as risks recoverable data due to redundancy in</p>

the data warehouse and trained on best security measures and expected downtimes with expected feedback. Furthermore, there was ongoing risk assessment post-launch to ensure no anomalies. Without these efforts, the software is vulnerable. We used GitHub for version control, a change management request was formally submitted with required documentation, and a system acknowledgement document was signed to acknowledge changes made going forward. All of this was necessary to maintain a clean and stable system while project requirements changed. The awareness and learning about such things helped create better security and reliability with stabilized project adjustments to keep us on the right path for a successful AI health monitoring project.

#### **Peer Interactions**

We spoke several times throughout the week on Google Meet, Zoom, WhatsApp, and even had a sit-down in the library. This was a fantastic opportunity to not only catch up on progress midweek but to also cement a few outstanding decisions regarding effort estimation and update the risk document. We discussed regarding COCOMO vs. Function Point Analysis and assessing what real-world risks exist using AI in healthcare, and we ensured our risk assessment and estimation was on point.

#### **Challenges Faced**

Many of the estimations were hard to achieve because estimating the amount of effort was based on previously known training times for the AI models and effort review of case studies and corresponding communication with other teammates to generate a uniform estimate. Many of the estimations were hard to achieve in terms of reliability because reliability was given as a percentage based on what was done in the past for similar endeavors. Assessing the overlap between risk management and Agile was hard because so much of the Agile project encourages flexibility, but creating a plan for each step of the risk management process requires a lot of predetermined expectations. We solved this by agreeing to assess the risks again each sprint.

#### **Personal development activities**

To expand on classroom knowledge, I independently studied through real-world case studies of COCOMO and risk management found online, applying the latter to IEEE Standards for Risk Management. I attended various online workshops from those focused on risk estimation and risk avoidance strategies to one on Agile risk management to understand this iterative approach to the process. I also independently studied by personally navigating JIRA for risk tracking and configuration management and created my own configuration risk matrices and estimation arrays.

#### **Goals for the Next Week**

Next week, I want to expand upon deliverable 2 by further exploring project goals and adjusting our endeavor assessment. I want to expand upon the risk management assessment by refining the risk quantification and exploring additional, applicable AI mitigation strategies in the field. Finally, I want to expand upon the configuration management plan by addressing CI/CD pipelines for automated deployment as well as some version control audits for data quality. All should lead to a more effective AI health monitoring application with sound risk management and proper project implementation.