# CS 499 Module One Assignment Template

Complete this template by replacing the bracketed text with the relevant information.

1. **Self-Introduction:** Address all of the following questions to introduce yourself.
   1. How long have you been in the Computer Science program?

**I have been in the Computer Science program since August of 2023.**

* 1. What have you learned while in the program? List three of the most important concepts or skills you have learned.

**Three important concepts or skills I have learned are how to use OOP principles, understanding SDLC and how to design, test, and deploy software that meets user requirements, and I have developed skills working with databases such as MongoDB.**

* 1. Discuss the specific skills you aim to demonstrate through your enhancements to reach each of the course outcomes.

**In order to show my understanding of software engineering, I plan to change the codebase from Java to Kotlin, improve readability and maintainability, and follow industry standards. I will demonstrate the use of algorithms by incorporating visual analytics and sorting options, which will allow users to effectively organize and display event data. Moving from SQLite to Firebase also demonstrates my abilities to deal with real-time, scalable databases that integrate multi-device syncing and secure user authentication. My abilities in database administration, data manipulation, and software design are demonstrated by these improvements.**

* 1. How do the specific skills you will demonstrate align with your career plans related to your degree?

**The skills I will demonstrate align with my professional goals of creating user-focused applications. My goal is to build a solid foundation in app development by improving my abilities and acquire real-world experience by improving the app I built for my CS360 project. This will allow me to turn my ideas into practical, usable applications for future projects. This project helps me achieve my goal of creating applications that offer significant value to users.**

* 1. How does this contribute to the specialization you are targeting for your career?

**Enhancing this app helps me achieve my preferred specialization in app development. Showcasing these abilities is important for coming up with creative and useful solutions that enhance user experiences and meet practical demands. I am able to build a solid foundation in the technical and design aspects of app development thanks to this project.**

1. **ePortfolio Set Up:**
   1. Submit a **screen capture** of your ePortfolio GitHub Pages home page that clearly shows your URL.
      1. You already have a repository in GitHub where you uploaded projects in previous courses. Your ePortfolio will reside in GitHub but can link to work at other sites, such as Bitbucket.
   2. Use the GitHub Pages link in the Resource section for directions on:
      1. How to create your GitHub website and publish code to GitHub Pages
      2. Issues, such as adding links to other sites
   3. Paste a screenshot of your GitHub Pages home page with your URL clearly showing in the space below.

**A screenshot of a computer

Description automatically generated**

1. **Enhancement Plan:** 
   1. **Category One:** Software Engineering and Design
      1. **Select an** **artifact** that is **aligned with** **the** software engineering and design **category** and explain its origin. Submit a file containing the code for the artifact you choose with your enhancement plan.

**CS 360: Mobile Architecture and Programming**

Note: Your artifact may be work from the following courses:

* IT 145: Foundation in Application Development
* CS 250: Software Development Lifecycle
* CS 260: Data Structures and Algorithms
* IT 315: Object Oriented Analysis and Design
* CS 320: Software Testing, Automation, and Quality Assurance
* CS 330: Computational Graphics and Visualization
* CS 340: Advanced Programming Concepts
* CS 350: Emerging Systems Architectures and Technologies
* CS 360: Mobile Architecture and Programming
* IT 365: Operating Environments
* IT 380: Cybersecurity and Information Assurance
* CS 405: Secure Coding
* CS 410: Reverse Software engineering
* IT 340: Network and Telecommunication Management
* IT 380: Cybersecurity and Information Assurance
  + 1. **Describe** a practical, well-illustrated **plan** for enhancement in alignment with the category, including a pseudocode or flowchart that illustrates the planned enhancement.

**Kotlin is now the preferred language for Android development therefore, moving to Kotlin aligns with best practices and makes the app more maintainable for future enhancements. Kotlin’s features enhance the overall design and readability of the app (Bhatt & Bhatt, 2024).**

**Start: Select a Java class to convert**

**Step 1: Use Android Studio’s Java-to-Kotlin converter**

* **If conversion fails -> Review & fix manually**

**Step 2: Refactor code to be optimized for Kotlin**

**Step 3: Test the converted code**

* **If tests fail -> Debug and re-test**

**Step 4: Repeat for all classes**

**End: Entire codebase successfully converted to Kotlin**

For this category of enhancement, consider improving a piece of software, transferring a project into a different language, reverse engineering a piece of software for a different operating system, or expanding a project’s complexity. These are just recommendations. Consider being creative and proposing an alternative enhancement to your instructor.

Think about what additions to include to complete the enhancement criteria in this category. Since one example option is to port to a new language, that is the kind of scale that is expected. This does not mean you need to port to a new language but instead have an equivalent scale of enhancement. Underlying expectations of any enhancement include fixing errors, debugging, and cleaning up comments, but these are not enhancements themselves.

* + 1. Explain how the planned enhancement will **demonstrate** specific **skills** and align with course outcomes.
       1. Identify and describe the specific skills you will demonstrate that align with the course outcome.

**By moving the codebase from Java to Kotlin, I am able to demonstrate my knowledge with modern tools and techniques, making the app more efficient. It also demonstrates my skills in testing debugging, and refactoring to make sure everything functions properly after the change. This aligns with course goals by showing software design and problem-solving in real-world development.**

* + - 1. Select one or more of the course outcomes below that your enhancement will align with.
* **Design and evaluate computing solutions that solve a given problem using algorithmic principles and computer science practices and standards appropriate to its solution while managing the trade-offs involved in design choices.**
* **Demonstrate an ability to use well-founded and innovative techniques, skills, and tools in computing practices for the purpose of implementing computer solutions that deliver value and accomplish industry-specific goals.**

Course Outcomes:

1. Employ strategies for building collaborative environments that enable diverse audiences to support organizational decision-making in the field of computer science.
2. Design, develop, and deliver professional-quality oral, written, and visual communications that are coherent, technically sound, and appropriately adapted to specific audiences and contexts.
3. Design and evaluate computing solutions that solve a given problem using algorithmic principles and computer science practices and standards appropriate to its solution while managing the trade-offs involved in design choices.
4. Demonstrate an ability to use well-founded and innovative techniques, skills, and tools in computing practices for the purpose of implementing computer solutions that deliver value and accomplish industry-specific goals.
5. Develop a security mindset that anticipates adversarial exploits in software architecture and designs to expose potential vulnerabilities, mitigate design flaws, and ensure privacy and enhanced security of data and resources.
   1. **Category Two:** Algorithms and Data Structures
6. **Select an artifact** that is **aligned with the** algorithms and data structures **category** and explain its origin. Submit a file containing the code for the artifact you choose with your enhancement plan. You may choose work from the courses listed under Category One.

**CS 360: Mobile Architecture and Programming**

1. **Describe** a practical, well-illustrated **plan** for enhancement in alignment with the category, including a pseudocode or flowchart that illustrates the planned enhancement.

**For this category the plan is to add sorting options and improve calendar navigation with daily and monthly views. Sorting will let the users organize their events by date, title, or priority, and the app will dynamically update the event list to reflect the selected options. For the calendar, a daily view will show all events for a chosen day, while the monthly view will highlight dates with events and allow easy navigation to specific days. The current setup just has the main screen where all events are displayed in a list, this can become overwhelming as the number of events grows. By adding different views, the app becomes much more organized. These updates will make the app more intuitive and user-friendly while demonstrating skills in algorithms, data structures, and UI integration.**

**Pseudocode for Sorting Options:**

**function onSortOptionSelected(option):**

**if option == "Date":**

**sortEventsByDate()**

**elif option == "Title":**

**sortEventsByTitle()**

**elif option == "Priority":**

**sortEventsByPriority()**

**function sortEventsByDate():**

**events.sortBy(event.date) // Sort chronologically**

**updateRecyclerView(events)**

**function sortEventsByTitle():**

**events.sortBy(event.title) // Sort alphabetically**

**updateRecyclerView(events)**

**function sortEventsByPriority():**

**events.sortBy(event.priority) // Sort by priority**

**updateRecyclerView(events)**

**function updateRecyclerView(sortedEvents):**

**recyclerView.setData(sortedEvents)**

**recyclerView.refresh()**

**Pseudocode for Calendar Views:**

**// Daily View**

**function showDailyView(selectedDate):**

**dailyEvents = filterEventsByDate(selectedDate)**

**updateRecyclerView(dailyEvents)**

**// Monthly View**

**function showMonthlyView():**

**calendar = MaterialCalendarView()**

**highlightDatesWithEvents(calendar, events)**

**function highlightDatesWithEvents(calendar, events):**

**foreach event in events:**

**calendar.highlightDate(event.date)**

**function onDateSelected(date):**

**showDailyView(date)**

For this category of enhancement, consider improving the efficiency of a project or expanding the complexity of the use of data structures and algorithms for your artifact. These are just recommendations. Consider being creative and proposing an alternative enhancement to your instructor. Note: You only need to choose one type of enhancement per category.

Think about what additions to include to complete the enhancement criteria in this category. Since one example option is to port to a new language, that is the kind of scale that is expected. Perhaps you might increase the efficiency and time complexity of an algorithm in an application and detail the logic of the increased time complexity. Remember, you do not need to port to a new language but instead have an equivalent scale of enhancement. Underlying expectations of any enhancement include fixing errors, debugging, and cleaning up comments, but these are not enhancements themselves.

1. Explain how the planned enhancement will **demonstrate** specific **skills** and align with course outcomes.
   1. Identify and describe the specific skills you will demonstrate to align with the course outcome.

**The planned enhancement will show my ability to design and implement effective algorithms and data structures to improve user experience. By including sorting options, I will show my ability to use Kotlin's built-in methods to create dynamic sorting logic and include this feature into the user interface of the application. The addition of daily and monthly calendar views demonstrates my ability to efficiently work with and filter data structures while incorporating third-party libraries, such as MaterialCalendarView, to improve navigation. These updates reflect a strong understanding of algorithmic principles, problem-solving, and user-focused software design, which are key skills necessary for success.**

* 1. Select one or more of the course outcomes listed under Category One that your enhancement will align with.
* **Design and evaluate computing solutions that solve a given problem using algorithmic principles and computer science practices and standards appropriate to its solution while managing the trade-offs involved in design choices.**
* **Demonstrate an ability to use well-founded and innovative techniques, skills, and tools in computing practices for the purpose of implementing computer solutions that deliver value and accomplish industry-specific goals.**
  1. **Category Three: Databases**
     1. **Select an artifact** that is **aligned with the** databases **category** and explain its origin. Submit a file containing the code for the artifact you choose with your enhancement plan. You may choose work from the courses listed under Category One.

**CS 360: Mobile Architecture and Programming**

* + 1. **Describe** a practical, well-illustrated **plan** for enhancement in alignment with the category, including a pseudocode or flowchart that illustrates the planned enhancement.

**The plan to enhance this portion of the app involves migrating the database from SQLite to Firebase. This change will enable real-time synchronization across devices, better scalability, and integration with Firebase Authentication for secure user-specific data handling (GeeksforGeeks, 2024).**

**Pseudocode for Firebase Integration:**

**// Initialize Firebase**

**function initializeFirebase():**

**FirebaseApp.initializeApp(context)**

**firestore = FirebaseFirestore.getInstance()**

**auth = FirebaseAuth.getInstance()**

**// User Authentication**

**function authenticateUser(email, password):**

**auth.signInWithEmailAndPassword(email, password)**

**onSuccess: proceed to fetchUserData()**

**onFailure: displayError("Authentication Failed")**

**// Fetch User Data**

**function fetchUserData():**

**userId = auth.getCurrentUser().getUid()**

**firestore.collection("events").where("userId", "==", userId).get()**

**onSuccess: displayEvents(data)**

**onFailure: displayError("Data fetch failed")**

**// Add New Event**

**function addEvent(event):**

**userId = auth.getCurrentUser().getUid()**

**firestore.collection("events").add({**

**"userId": userId,**

**"title": event.title,**

**"date": event.date,**

**"priority": event.priority**

**})**

**onSuccess: displaySuccess("Event added")**

**onFailure: displayError("Failed to add event")**

For this category of enhancement, consider adding more advanced concepts of MySQL, incorporating data mining, creating a MongoDB interface with HTML/JavaScript, or building a full stack with a different programming language for your artifact. These are just recommendations; consider being creative and proposing an alternative enhancement to your instructor. Note: You only need to choose one type of enhancement per category.

Think about what additions to include to complete the enhancement criteria in this category. Since one example option is to port to a new language, that is the kind of scale that is expected. Perhaps you might increase the efficiency and time complexity of an algorithm in an application and detail the logic of the increased time complexity. Remember, you do not need to port to a new language but instead have an equivalent scale of enhancement. Underlying expectations of any enhancement include fixing errors, debugging, and cleaning up comments, but these are not enhancements themselves.

* + 1. Explain how the planned enhancement will **demonstrate** specific **skills** and align with course outcomes.
       1. Identify and describe the specific skills you will demonstrate that align with the course outcome.

**The planned improvement will show that I can set up and maintain cloud-based databases while guaranteeing safe and scalable data processing. By switching from SQLite to Firebase, I will demonstrate my ability to create organized, user-specific collections and documents for efficient data management. My ability to secure user data and manage access control, guaranteeing privacy and dependability, is demonstrated by the integration of Firebase Authentication. These skills reflect a strong knowledge of database architecture, cloud integration, and user-focused software development.**

* + - 1. Select one or more of the course outcomes listed under Category One that your enhancement will align with.
* **Demonstrate an ability to use well-founded and innovative techniques, skills, and tools in computing practices for the purpose of implementing computer solutions that deliver value and accomplish industry-specific goals.**
* **Develop a security mindset that anticipates adversarial exploits in software architecture and designs to expose potential vulnerabilities, mitigate design flaws, and ensure privacy and enhanced security of data and resources.**

1. **ePortfolio Overall Skill Set**
   1. Accurately describe the **skill set** to be illustrated by the **ePortfolio** **overall**.
      1. Skills and outcomes planned to be illustrated in the code review

**The ePortfolio showcases a mix of modern programming, problem-solving, and secure database management skills. It highlights how I’ve applied industry practices, like migrating to Kotlin for better code and using Firebase for scalable, secure data management. These examples demonstrate my ability to design efficient, user-friendly, and secure solutions for real-world applications.**

* + 1. Skills and outcomes planned to be illustrated in the narratives

**The narratives will highlight my skills in designing user-friendly solutions, solving problems with efficient algorithms, and managing data securely using modern tools. They’ll show how I’ve applied these skills to real-world projects, like enhancing app functionality and improving user experience. Overall, they demonstrate my ability to combine technical expertise with thoughtful design to create practical solutions.**

* + 1. Skills and outcomes planned to be illustrated in the professional self-assessment

**The professional self-assessment will focus on how I’ve grown as a developer, emphasizing on my ability to adapt to new technologies and tackle complex challenges. It will highlight my journey in building efficient, secure, and user-friendly solutions, showing how these experiences have shaped my skills and prepared me for the next steps in my career.**

**Resources:**

**Bhatt, T., & Bhatt, T. (2024, May 9). *Why Kotlin for Android App Development [Complete overview]*. Intelivita. https://www.intelivita.com/blog/why-kotlin-for-android-app-development/**

**GeeksforGeeks. (2024, October 8). *How to save data to the Firebase Realtime Database in Android?* GeeksforGeeks. https://www.geeksforgeeks.org/how-to-save-data-to-the-firebase-realtime-database-in-android/**