

CENG350 SOFTWARE ENGINEERING
SPRING 2023-2024
PROJECT SPECIFICATION, v1.0

You will perform modeling activities related to (i) requirements engineering and (ii) architecture design for a particular software-intensive system and prepare the associated documents complying with the related standards.

The topic of this semester's project is the *FarmBot* [1]. It is an open-source, CNC (computer numerical control) farming machine that aims to bring precision agriculture to individuals' homes or small-scale farms. FarmBot is notable for being a completely open-source project, which means that its hardware designs, software code, and documentation are freely available for anyone to access, use, modify, and distribute. Considering the limitations of our course, we will focus on the **software for the Express model of Farmbot**.

Resources of FarmBot:

- 1) Official Website: The primary source for FarmBot information, including documentation, guides, FAQs, and updates on development and usage. You can visit the official website to access these resources.
- 2) GitHub Repository: Contains the project's source code, hardware designs, CAD files, and documentation. You can explore the FarmBot GitHub repository for technical insights and community contributions.
- 3) Academic Databases: The FarmBot whitepaper [2], serves as an initial document for the foundations. You can also search academic databases such as Google Scholar for research articles related to FarmBot and its applications.
- 4) FarmBot Forum: An online community where users, developers, and enthusiasts discuss FarmBot, share experiences, and seek assistance. You can find user-generated content and valuable insights on the forum.
- 5) YouTube: You can access user-generated content, demonstrations, and tips for using and customizing FarmBot systems on YouTube.

These resources provide a comprehensive understanding of FarmBot, its technology, software, applications, and community-driven development process.

The major task in this semester's project is modeling and documenting the ***FarmBot Express software*** as is. Further, we encourage the students to propose improvements to FarmBot. You are encouraged to tap into your creativity and innovative spirit to suggest and model improvements that could further enhance the system's functionality, performance, and utility.

Deliveries (both in two installments):

- i) System/Software Requirements Specification (SRS) (ISO/IEC/IEEE 29148-2018, clause 9.6) [16% = 1.6% for part-1 + 14.4% for final document]
- ii) System/Software Architecture Description (SAD) (ISO/IEC/IEEE 42010-2022, clause 6, and additional reference on architectural viewpoints) [20% = 2% for part-1 + 18% for final document]

Guidance will be provided on the use of these standards. In particular, software requirements and software architecture will be necessarily dependent on system requirements and system architecture.

Project work, including background knowledge, will be part of examination coverage (midterm and final exams).

Ground Rules:

- You may work alone or in a group of 2 or 3 students. The workload will be the same for one-person and two-person groups. Three-person groups have to undertake additional work.
- Any submission (or a part thereof) containing significant similarity with another, for whatever reason, will not be acceptable.
- Modeling language is UML 2.x (possibly with some help from SysML). You must use StarUML [3], the most recent version (v6.0.1).
- When you need clarification on *FarmBot* you may pose your questions on our ODTUClass discussion forum.
- Document outlines and the rubrics for grading will be issued separately. You are expected to work on the *best-effort* principle. This is important as modeling is an open-ended endeavor.
- Discussion and delivery medium: ODTUClass. Follow the instructions, clarifications, and updates.
- For specific administrative matters you may send an e-mail to TA İbrahim Tarakcı (tarakci@ceng.metu.edu.tr).

Detailed Schedule

- 1) **SRS part-1**: Due March 29, 23:59. Software Requirements Specification (SRS) document including the system context and the use-case model only.
- 2) **SRS final**: Due April 5, 23:59. The complete SRS.
- 3) **SAD part-1**: Due May 10, 23:59. Software Architecture Description (SAD) document including the composition view only.
- 4) **SAD final**: Due May 17, 23:55. The complete SAD.

Late submission will be subject to a significant penalty.

References:

- [1] <https://farm.bot/>
- [2] Aronson, R. L. (2013). FarmBot Whitepaper. URL: <https://farm.bot/pages/whitepaper>
- [3] <https://staruml.io/>