**ISTD 50.001**

**INTRODUCTION TO INFORMATION SYSTEMS & PROGRAMMING**

**Fall 2020**

**Project: 1-D Information Systems Design Project**

Last updated on 11-Sept-2020

**Introduction**

**Information systems for a Smart Nation**

Advances in information technology have opened up new possibilities to enhance the way we live, work, play, and interact. Singapore government has announced the plan to make Singapore a Smart Nation, to support better living, stronger communities, and create more opportunities, for all. Different information systems are key enablers for a Smart Nation: web systems, cloud computing, Internet of Things (IoT) systems, chatbots, mobile Apps, artificial intelligence, etc. For example, a wearable device on a student can sense the physiological conditions and predict the student’s engagement level during a class. An intelligent chatbot app can collect medical information from people and then pass it to doctors in a form that makes it easier to use for diagnostic purposes. A motion sensor can remotely monitor the activity of an elderly, and it can send a message to his/her caregiver’s smartphone if some anomaly is detected.



**Project Requirements**

Working as a team (five students), you are required to propose, design and build a meaningful solution using the information systems concepts, software and system components. The proposed solution should address an open problem under a broad range of themes, including but not limited to:

* Smart classroom
* Smart campus
* Smart care-at-home
* Smart home automation
* Smart office and workplace

**It is a requirement that the system development shall make use of Java extensively, and make use of good software practice and effective programming: Object-oriented design, inheritance, polymorphism, encapsulation, abstract class, interface, generic programming, various design patterns, Android programming, etc. Please refer to Rubric for specific details.**

Resource and budget for the project: **Each team will be given some budget** to purchase devices, electronic components or other items to accomplish the project. The purchase request needs to be justified. Please discuss with instructors for such request.

**Deliverable, Checkoffs, Grading and Rubric**

1. **Checkoff-1 [15%]: Problem Framing, Initial Solution, Project Schedule**

Problem framing: The team needs to explore the design and problem area, context etc. The team needs to frame and define the problem, present the key requirements and constraints that will guide their design.

Initial solution idea: The team shall take the problem and propose some initial solution ideas.

Project schedule: There should be a schedule for further exploration of the idea, implementation of the prototype, schedule and deadline for parts and components ordering, and testing and debugging.

The team will present these findings when meeting with instructors and hand in the slides for further grading.

1. **Checkoff-2 [5%]: Prototype Development**

The team should be in the middle of their detailed design and prototyping. Ideally, they should have some initial testing results. They should be able to prove the key aspects of their solution. The team will discuss the progress with the instructors to obtain checkoff. The students should include any relevant support material such as system design diagrams or initial prototypes.

1. **Checkoff-3 [70%]: Final System Prototype**

The team should present their final deliverable. There should be something concrete at the end as the deliverable, not just a paper or theoretical concept. **In particular, it is a requirement to have a working prototype that can solve the intended problem to an extent. Furthermore, it is a requirement to apply good software practice and Android programming discussed in classes. Please see Rubric.**

The team will present these findings in a presentation during the Exhibit, and hand in a poster for further grading. The team shall also submit the runnable source code, a short report to describe the system design and implementation. The short report (about 4 pages) shall include documents of the system design and future work. Furthermore, the report shall include **effort and contribution of each individual team member**, and individual effort will be taken into account for grading.

1. **Checkoff-4 [10%]: Exhibit**

The team shall set up and demonstrate their prototype at an exhibit. They should present the problem, idea, solution and system design to the visitors.

**Grading and Rubric:**

Checkoff-1 [15%]: Problem Framing, Initial Solution, Project Schedule

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| --- | --- | --- |
| Deliverable / Grading item | Grading criteria | Remark |
| Problem framing (5%) | * How well is the description of the area/context/problem/state-of-the-art? * To what extent is the problem clearly and concisely defined based on insightful interpretation and compilation of the background information? * To what extent is the problem exciting and open to new innovations? |  |
| Requirement analysis (4%) | * How thorough is the analysis of stakeholders’ needs and constraints? |  |
| Initial solution (4%) | * How well is the description of the initial hints of design direction and potential solution? |  |
| Project schedule (1%) | * How well is the project schedule organized and up-to-date with realistic milestones? Are the tasks divided into specific activities and assigned to individuals or groups of individuals? |  |
| Team sign up by due date (1%) |  |  |

Checkoff-2 [5%]: Prototype Development

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| --- | --- | --- |
| Deliverable / Grading item | Grading criteria | Remark |
| Development status and quality (4%) | * How well is the prototype on its way to be a meaningful and innovative solution to the problem statement? * Is there clear evidence of converging toward an end solution? * Are all essential components or key aspects of the prototype in place or actively developed? |  |
| Updated project schedule with tracking (1%) | * How clear is the progress shown? * How clear is the schedule / project plan being applied? |  |
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Checkoff-3 [70%]: Final System Prototype

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| Deliverable / Grading item | Grading criteria | Remark |
| System design (10%) | * To what extent does the prototype make use of IS concepts, software and system components? * To what extent does the prototype include innovative use of IS concepts, software and system components? * To what extent does the prototype make use of object-oriented and modular design to develop the software and system? |  |
| Software development and effective programming (20%) | * To what extent does the software make use of good software practice and effective programming: encapsulation, inheritance, polymorphism, abstract class, interface, generic programming, various design patterns, etc.? These should be presented to the instructors during final grading and be documented in the final report. |  |
| Android programming (20%) | * To what extent does your app make use of the Android framework to  (1) store, retrieve and display information effectively,  (2) to allow for effective user interaction? * These should be presented to the instructors during final grading and be documented in the final report. |  |
| Functional prototype and testing (10%) | * How well does the final prototype really work and solve the problem? * How well can the final prototype work under different operating environments and test cases? |  |
| User interaction and user friendliness (10%) | * How easy to use the system? From the end-user perspective and the system operator perspective. * Does the user interaction suit the intended application? |  |
| Items checklist | * Presentation at the Exhibit * Poster * Runnable source code * A short report (4-page) |  |

Checkoff-5 [10%]: Exhibit

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| Deliverable / Grading item | Grading criteria | Remark |
| Prototype set-up and demonstration (4%) | * How well is the prototype set-up and displayed in the exhibition? * How well is the prototype demonstrated to the visitors? |  |
| Presentation (4%) | * Can the team explain the problem, solution, prototype and system design clearly? |  |
| Feedback from the visitors (2%) | * How positive are the feedbacks from the visitors? |  |
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