

**BRAC UNIVERSITY**  
**Department of Computer Science and Engineering**

Examination: Midterm  
Duration: 1 hour 30 mins + 10 mins

Semester: Fall 2023  
Full Marks: 25

**CSE 471: System Analysis and Design**

- 1 Calculate the **Break-Even Point** and **Return of investment** using the following information.

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	Year 0	Year 1	Year 2	Year 3
Total benefits	30,000	35,000	30,000	50,000
Total costs	72,000	22,000	10,000	17,000

- 2 Along with the new campus, Brac University is introducing a smart campus app for all the students which is a comprehensive tool that simplifies and enhances the student experience on campus.

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The student logs in to the app and selects the "Course Schedule" option. The app displays the student's current course schedule, including course names, faculties, locations, and links to course materials (if available). The student can see an interactive campus map with buildings. They can search for specific locations on the map, such as classrooms, libraries, and dining halls. The app provides indoor navigation capabilities to guide the student to their desired destination. A real time AR view might be possible if it is connected to an external AR-VR app.

The student can report any Incident to the security officer by including the details of the incident. They can attach photos or videos of the incident if present and submit it. A security officer receives an alert about the incident and responds to the location as quickly as possible. The student can view a comprehensive list of campus services and resources, including dining halls, libraries, student support services, career counseling, and more. The student can access detailed information about each service. The student receives push notifications about upcoming campus events, announcements, and important updates from OCR. The student can view a list of all past and upcoming events, including descriptions, dates, and locations.

Students can also provide feedback on the app's features, usability, and overall experience to the Registrar's office. The student can submit bug reports if there are any technical issues.

Finally, only graduate students can submit degree completion forms and download their transcript.

Now **Design** an Use-Case diagram based on the above scenario.

P.T.O

3	<p>Suppose you are designing an online script-checking system for admission tests. There will be an exam committee for each department that controls the overall exam process. The committee will be formed before each exam. The department Chairman, DCO, and the examiners will be the members of this committee. So, they will be the stakeholders of this system.</p> <p>Firstly, the students will submit their scanned scripts into the system after the completion of the exam. There will be two types of script-checking methods: single-examiner and dual-examiner. If the chairman selects the dual-examiner method, the DCO will send the exam scripts to both 1st examiner and 2nd examiner. After completing the script checking, both examiners will upload the checked scripts. Both examiners will also input the marks of each question into the system. If all the scripts and marks are uploaded successfully, the system will notify the DCO. Otherwise, it will notify the examiners to upload again. After receiving all the checked scripts and marks, the DCO forwards the marks to the Chairman. If there is a significant mark difference between the two examiners, the Chairman can assign a 3rd examiner and forward those scripts to him/her. After completion of script checking, the 3rd examiner will upload the marks to the system. If there is no significant mark difference, the system will take the average of the marks given by the 1st examiner and the 2nd examiner. If the chairman selects the single-examiner method, the examiner will receive the scripts automatically after the exam. He/she will upload the checked scripts along with the marks. For both script-checking methods, a tabulation sheet will be generated after that. This tabulation sheet will be verified by the pro-VC of the university. After verification, the result will be published automatically on the university website.</p> <p><b>Design</b> an activity diagram based on this scenario.</p>	6
4	<p>Suppose Brac University has developed an online proctored exam system for taking online exams. Here, at first, a student initiates the start exam request. After that, the exam system validates the students. After validating the request, the exam system loads the exam questions with instructions. When the student sees the exam interface, the proctoring system receives a signal from the exam system for activation. The proctoring system then accesses the webcams and microphones of the student. After answering each question, the student submits the answer to the exam system. This process applies to all the questions. While monitoring the exam, if the proctoring system finds anything suspicious, it sends a warning message to the student. If the student receives more than 2 warnings, the proctoring system sends a pause message to the exam system, and the exam system freezes the interface. The proctor system then checks the session. If no issues are found, the exam system resumes the exam. Otherwise, the system cancels the exam by showing a message to the student. If the exam resumes, the student continues to answer questions. After the exam ends, the exam system sends the answers to the evaluation system for evaluation.</p> <p>Now <b>Design</b> a Sequence Diagram for the above scenario.</p>	6