**American International University – Bangladesh (AIUB)**

**Faculty of Engineering**

**Department of CSE, EEE, and CoE**

**EEE4103 MICROPROCESSOR AND EMBEDDED SYSTEM**

**COURSE CAPSTONE PROJECT PROPOSAL FORM**

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| **SEMESTER: SPRING 2023-2024** |
| **PROJECT TITLE:** Multilevel Car Parking System |
| **SURVEY:** |
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| **AIMS AND OBJECTIVES OF THE PROJECT:**  The main objective of this project is to prevent crowding and congestion in the parking lot while also providing the user or car owner with an appropriate automatic space availability response. This project demonstrates how to build a multilevel parking system utilizing digital logic elements such latches, logic gates, Arduino boards, and 7-segment displays. This will show and open gate for whether any level or which level has vacant parking space or not for avoiding extra vehicle entrance jam and handling car parking safety. |
| **LITERATURE REVIEW:**  The journal article under review presents a well-structured and informative study on the design and implementation of car parking system using digital logic, microprocessor and embedded systems. This section begins by different publication authors explaining that in this car park management system, sensors are deployed to the parking lots to monitor and detect the occupation status of the parking lots, and to cooperatively process and transmit the information to a management system. By using the management system, the managers and administrators will be able to get the information about the parking field, including statistics and real-time information. In addition, the management system can alert the illegal mobility of the car parking in the field. In the first publication, they emphasized on the importance of using ARM Cortex-A8 processor, a powerful system-on-chip, graphics LCD, seven segment display, IDE for specific microprocessor used etc. [**Embedded Based Smart Car Parking System using Shared Memory**, ***IJSRD - International Journal for Scientific Research & Development| Vol. 3, Issue 01, 2015 | ISSN (online): 2321-0613*** ] One notable strength of the article is the thoroughness of the design process. In other publication, **PRS** use technology to reserve a parking space ahead of arrival, ensuring that the desired slot for the vehicle is held, and providing the system with the ability to indicate to the other drivers those places that were already reserved and are not available. PRS require data centers or servers to be set up, where all reservations and inquiry operations concerning available parking are processed and a communication system between the users and these servers is established [Survey of Smart Parking System, **published: 2 June 2020]** The authors provide detailed explanations of the theoretical calculations involved in selecting appropriate component values for achieving the desired. This allows readers to grasp the underlying principles and make informed decisions in their own designs. The implementation section of the paper is well-documented, with clear illustrations and step-by-step instructions for building the circuit on a breadboard. The authors provide pin configurations and connections for ensuring easy replication of the circuit by other researchers or electronics enthusiasts. The experimental section is particularly commendable, as it includes measurement analysis using a simulator. The authors compare the measured values with the theoretical calculations, providing a comprehensive assessment of the circuit's performance. This approach enhances the credibility of the study and demonstrates the accuracy and effectiveness of the design.  Publications:  1. Embedded Based Smart Car Parking System using Shared Memory, ***IJSRD - International Journal for Scientific Research & Development| Vol. 3, Issue 01, 2015 | ISSN (online): 2321-0613***  2. Survey of Smart Parking System, **Published: 2 June 2020**  [**https://www.mdpi.com/2076-3417/10/11/3872**](https://www.mdpi.com/2076-3417/10/11/3872)  3. Advanced Car Parking System using System  <https://ieeexplore.ieee.org/abstract/document/8014701>  4. Beebe, R.S. and PLANNING, T., 2001. Automated parking status in the United States–Advantages and Criteria. Parking and transportation planning consulting engineers Group Inc. USA.  <https://worldparkingsymposium.ca/parking-library/download/137/00000137_d010010wx.pdf>  5. Demegillo, A. R., Dizon, J. K. D., Talon, K. B. A., Balahadia, F. F., & Lingo, O. M. (2016). Real-time viewing automated parking system. 2016 IEEE Region 10 Symposium (TENSYMP), 145–149.  <https://doi.org/10.1109/TENCONSpring.2016.7519394> |
| **EXPERIMENTAL BLOCK DIAGRAM:** |
| **POSSIBLE OUTCOMES OF THE PROJECT:** In this project, the concept of multilevel parking system is to use sensors to detect whether there is a free parking space available or not. Our proposed system focuses to provide the assistive for smart vehicle parking system using the concept of microprocessor and embedded systems and digital logic altogether. In conclusion, the multilevel parking system project using digital logic component, sensor, Arduino board provide an effective and reliable solution for managing parking spaces. The system accurately should detect vehicle entry and parking availability, guide driver to empty spot and incorporate features light display and LEDs. Future advancement to this system can make it more easy and secure to use**.** So that, the social and economic benefit feed off without the traffic problem and save people’s time and patience. |
| **PROJECT TIMELINE (GANTT CHART):** |
| **REFERENCES:**  Reference of journal paper:[1] Beebe, R.S. and PLANNING, T., 2001. Automated parking status in the United States–Advantages and Criteria. Parking and transportation planning consulting engineers Group Inc. USA.  <https://worldparkingsymposium.ca/parking-library/download/137/00000137_d010010wx.pdf>  Reference of conference paper:[2] **Embedded Based Smart Car Parking System using Shared Memory**, ***IJSRD - International Journal for Scientific Research & Development| Vol. 3, Issue 01, 2015 | ISSN (online): 2321-0613*** |

**FOR FACULTY USE ONLY**

**COMMENTS BY COURSE TEACHER:**

**COURSE TEACHER’S NAME COURSE TEACHER’S SIGNATURE DATE**

**GROUP MEMBERS**

(Maximum 6 students are permitted to carry out a single Project. However, depending on the capability of the students, 4 students may be allowed but not less than that)

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| **NAME**: Rafsan Mahmud  **ID #:** 22-46207-1  **PROGRAM:** CSE  **EMAIL:** [22-46207-1@student.aiub.edu](mailto:22-46207-1@student.aiub.edu) | **NAME**: Akid Mahmud  **ID #:** 22-46211-1  **PROGRAM:** CSE  **EMAIL:** [22-46211-1@student.aiub.edu](mailto:22-46211-1@student.aiub.edu) |
| **NAME**:Ishtiak Billah Emon  **ID #:** 22-46229-1  **PROGRAM:** CSE  **EMAIL:** [22-46229-1@student.aiub.edu](mailto:22-46229-1@student.aiub.edu) | **NAME**: M Shahriar Alam Sajid  **ID #:** 22-46242-1  **PROGRAM:** CSE  **EMAIL:** [22-46242-1@student.aiub.edu](mailto:22-46242-1@student.aiub.edu) |
| **NAME**: Afia Akter Maria  **ID #:** 22-46442-1  **PROGRAM:** CSE  **EMAIL:** [22-46242-1@student.aiub.edu](mailto:22-46242-1@student.aiub.edu) | **NAME**: Labuny Akter Jim  **ID #:** 21-45153-2  **PROGRAM:** CSE  **EMAIL:** [21-45153-2@student.aiub.edu](mailto:21-45153-2@student.aiub.edu) |
| **REMARKS (for OFFICE use only)** | |

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| **Course Name:** | | Microprocessor and Embedded System | **Course Code:** | EEE 4103 |
| **Semester:** | | Spring 2023-2024 | **Sec: L** |  |
| **Faculty Member:** | |  | | |
|  | |  |  |  |
| **Capstone Project Title:** | | Multilevel Car Parking System | | |
| **Project Group No.** | | 03 | | |
|  | |  |  |  |
| **Sl #** | **Student ID #** | **Student Name** | **Obtained Marks** | |
| **1.** | **22-46207-1** | **Rafsan Mahmud** |  | |
| **2.** | **22-46211-1** | **Akid Mahmud** |  | |
| **3.** | **22-46229-1** | **Ishtiak Billah Emon** |  | |
| **4.** | **22-46242-1** | **M Shahriar Alam Sajid** |  | |
| **5.** | **22-46442-1** | **Afia Akter Maria** |  | |
| **6.** | **21-45153-2** | **Labuny Akter Jim** |  | |

**Assessment Materials and Marks Allocation:**

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| **COs** | **Assessment Materials** | **POIs** | **Marks** |
| CO3 | Course Capstone Proposal Form | P.c.2.C6 | 30 |

**Assessment Rubrics:**

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| --- | --- | --- | --- | --- | --- | --- | --- |
| KPIs | Excellent  [2] | Proficient  [1.5] | Good  [1] | Acceptable  [0.5] | Unacceptable  [0] | No Response  [0] | Secured Marks |
| **Project Title** | The title reflects an issue related to complex engineering problems showing targets and methods with possible outcomes. | The title reflects an issue related to complex engineering problems showing targets and methods but some missing issues. | The title reflects an issue related to the course capstone project but there may be some missing issues. | The title reflects an issue related to the course capstone project but is not complete or specific. | The title does not reflect any issues related to the course capstone project. | No Response at all/ copied from others /identical submissions with gross errors/ image file printed |  |
| **Comments** |  | | | | | **Total Marks (2)** |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| KPIs | Excellent  [5] | Proficient  [4] | Good  [3] | Acceptable  [2] | Unacceptable  [1] | No Response  [0] | Secured Marks |
| **Survey** | The survey developed as a process for complex engineering problems considering cultural and societal factors has superior variables, targets, measures, and the implementation process is clear and challenging for future project implementation with several possible outcomes having good impacts. | The survey developed as a process for complex engineering problems considering cultural and societal factors has good variables, targets, measures, and the implementation process is clear and challenging for future project implementation with some possible outcomes with little impact. | The survey developed as a process for complex engineering problems considering cultural and societal factors has moderate variables, targets, measures, and the implementation process is clear and challenging for future project implementation with a few possible outcomes with impacts. | The survey developed as a process for complex engineering problems considering cultural and societal factors has good variables, targets, measures, and the implementation process is somewhat clear for future project implementation with very few possible outcomes with little impact. | The survey developed as a process for complex engineering problems considering cultural and societal factors has poor variables, targets, measures, and the implementation process is very unclear for future project implementation with a few possible outcomes but no impacts. | No Response at all/ copied from others /identical submissions with gross errors/ image file printed |  |
| **Comments** |  | | | | | **Total Marks (5)** |  |
| KPIs | Excellent  [3] | Proficient  [2.5] | Good  [2] | Acceptable  [1] | Unacceptable  [0.5] | No Response  [0] | Secured Marks |
| **Aims and Objectives** | Aims and objectives are written to solve complex engineering problems considering cultural and societal factors with specific targets, measurement, and implementation processes that are clear and challenging and have several possible outcomes having very good impacts. | Aims and objectives are written to solve complex engineering problems considering cultural and societal factors with general targets, measurement, and implementation processes that are not clear and challenging and have some possible outcomes having good impacts. | Aims and objectives are written to solve complex engineering problems considering a few cultural and societal factors with narrow targets; measurement, and implementation processes are clear and challenging and have a few possible outcomes having some impacts. | Aims and objectives are written to solve complex engineering problems considering cultural or societal factors with a very target; measurement and implementation processes are not clear or challenging and have little possible outcome having no impact. | Aims and objectives are written to solve complex engineering problems but do not consider cultural and societal factors with any targets; measurement, and implementation processes are not clear and challenging and no possible outcomes have no impacts. | No Response at all/ copied from others /identical submissions with gross errors/ image file printed |  |
| **Comments** |  | | | | | **Total Marks (3)** |  |

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| KPIs | Excellent  [5] | Proficient  [4] | Good  [3] | Acceptable  [2] | Unacceptable  [1] | No Response  [0] | Secured Marks |
| **Literature Review** | Specific formats are maintained to review and cite the literature with recent publications. Identified and analyzed the problem correctly. | Specific formats are maintained to review and cite the literature with recent publications. Identified and analyzed the problem correctly, but all issues were not addressed with relevant or intended work. | Specific formats are maintained to review and cite the literature with recent and past publications. Identified and analyzed the problem correctly, but all issues were not addressed with relevant or intended work. | Specific formats are maintained to review and cite the literature with recent and past publications. Identified but could not analyze all the problems correctly, and all issues were not addressed with relevant or intended work. | No specific formats are maintained to review and cite the literature with recent publications. Could not identify and analyze all the problems correctly, and all issues are not addressed with relevant or intended work at all. | No Response at all/ copied from others/ identical submissions with gross errors/ image file printed |  |
| **Comments** |  | | | | | **Total Marks (5)** |  |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| KPIs | Excellent  [4] | Proficient  [3] | Good  [2] | Acceptable  [1] | Unacceptable  [0.5] | No Response  [0] | Secured Marks |
| **Experimental Block Diagram** | The block diagram is drawn to show the connections of all the possible components or sub-systems to show their interdependence with all possible flows of signals from inputs to outputs. | The block diagram is drawn to show the connections of all of the possible components or sub-systems to show their interdependence with a few missing flows of signals from inputs to outputs. | The block diagram is drawn to show the connections of most of the possible components or sub-systems to show their interdependence with a few missing flows of signals from inputs to outputs. | The block diagram is drawn to show the connections of a few possible components or sub-systems to show their interdependence with some missing flow of signals from inputs to outputs. | The block diagram is not drawn to show the connections of all possible components or sub-systems to show their interdependence and flow of signals from inputs to outputs. | No Response at all/ copied from others /identical submissions with gross errors/ image file printed |  |
| **Comments** |  | | | | | **Total Marks (4)** |  |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| KPIs | Excellent  [4] | Proficient  [3] | Good  [2] | Acceptable  [1] | Unacceptable  [0.5] | No Response  [0] | Secured Marks |
| **Possible Outcomes** | Outcomes are written to achieve complex engineering problems’ solutions considering cultural and societal factors and showing measurement, and implementation processes to attain the outcomes with all possible impacts. | Outcomes are written to achieve complex engineering problems’ solutions considering cultural and societal factors and showing measurement, and implementation processes to attain the outcomes with some impacts. | Outcomes are written to achieve complex engineering problems’ solutions considering cultural and societal factors and do not show measurement, and implementation processes to attain the outcomes without showing any impacts. | Outcomes are written to achieve complex engineering problems’ solutions but do not consider cultural and societal factors and do not show measurement, and implementation processes to attain the outcomes without showing any impacts. | Outcomes are not written to achieve complex engineering problems’ solutions do not consider cultural and societal factors and do not show measurement, and implementation processes to attain the outcomes without showing any impacts. | No Response at all/ copied from others /identical submissions with gross errors/ image file printed |  |
| **Comments** |  | | | | | **Total Marks (4)** |  |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| KPIs | Excellent  [5] | Proficient  [4] | Good  [3] | Acceptable  [2] | Unacceptable  [1] | No Response  [0] | Secured Marks |
| **Gantt Chart** | Specific formats are maintained to draw the Gantt chart and there is the order of workflow with all work to be done. | Specific formats are maintained to draw the Gantt chart and there is the order of workflow with a few works missing. | Specific formats are maintained to draw the Gantt chart and there is the order of workflow with some works missing. | No specific formats are maintained to draw the Gantt chart and there is little order of workflow with some works missing. | No specific formats are maintained to draw the Gantt chart and there is no order of workflow with the most important works missing. | No Response at all/ copied from others/ identical submissions with gross errors/ image file printed |  |
| **Comments** |  | | | | | **Total Marks (5)** |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| KPIs | Excellent  [2] | Proficient  [1.5] | Good  [1] | Acceptable  [0.5] | Unacceptable  [0] | No Response  [0] | Secured Marks |
| **References** | Specific formats are maintained to write the references, and all are recently published journal and conference papers having no missing information. | Specific formats are maintained to write the references, and all are journal and conference papers, but some old papers have missing information. | No specific formats are maintained to write the references, and many are internet sources with several missing information and very old references. | No specific formats are maintained to write the references and most of them are internet sources with missing information. | No specific formats are maintained to write the references, and all are internet sources with missing information. | No Response at all/ copied from others /identical submissions with gross errors/ image file printed |  |
| **Comments** |  | | | | | **Total Marks (2)** |  |