Risk assessment is a systematic process used to identify, analyze, and evaluate potential risks and uncertainties associated with a particular situation, project, or activity. It is a critical tool for decision-making and risk management in various domains, including business, environmental management, project management, and safety planning.

A general description of risk assessment involves the following key components:

Identification of Risks: The first step in risk assessment involves identifying potential risks and hazards that could impact the objectives, goals, or outcomes of a project or activity. This can encompass a wide range of factors, including external threats, internal weaknesses, and unforeseen events.

Analysis of Risks: Once risks are identified, they are analyzed to assess their likelihood and potential impact. This analysis considers the probability of each risk occurring and the severity of its consequences.

Risk Evaluation: In this phase, the assessed risks are evaluated to determine their significance and prioritize them based on their potential impact on the project or activity. Risks are categorized as high, medium, or low risk, helping decision-makers focus on the most critical issues.

Risk Mitigation and Control: After evaluating risks, strategies are developed to mitigate or control them. These strategies can include risk avoidance, risk reduction, risk transfer, or risk acceptance. Mitigation plans are put in place to minimize the likelihood and impact of high-risk events.

Monitoring and Review: Risk assessment is an ongoing process. Regular monitoring and review of the risk management plan help ensure that it remains effective and up to date. Adjustments are made as new risks emerge or as the project progresses.

Communication and Reporting: Effective communication of risks and risk management strategies to stakeholders is essential. Transparency and clear reporting allow for informed decision-making and a shared understanding of the risks involved.

Documentation: Comprehensive documentation of the entire risk assessment process is crucial. This includes recording identified risks, their analysis, evaluation, mitigation plans, and outcomes.

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Risk Assessment No.: *1*	Date: 3/11/2023	Version No.:1	Review Date: 4/11/2023	Authorised by: Dulan Perera

Step 1: Enter information about the task, activity or health and safety issue, including the location and the people completing the risk assessment

Reason for this risk assessment:

☐ New task ☐ New information ☐ Change to existing work environment/task/object/tool ☐ Report of injury ☐ Cyclic review

☒ Identification of a health and safety hazard ☐ Other: _____

Location (including building and room): AD103	Assessed by: Dulan Perera	HSR/worker representation:

Description of task/activity/issue (if necessary, observe/analyse the task being performed by different people at different times to capture variation in work flow)

This project involves the development of an Environmental Sensor Data Logger with SDI-12 interface, using an Arduino Due microcontroller. The system integrates multiple environmental sensors, including the BME680 sensor for temperature, humidity, pressure, and gas data, as well as the BH1750FVI sensor for digital light intensity measurements. The project aims to monitor and record environmental data for various applications, such as weather monitoring, environmental research, or industrial automation**.** The project aims to develop a robust and user-friendly environmental monitoring system. Implement data logging for long-term data storage and analysis, Create a graphical user interface for data visualization, Ensure system reliability, safety, and compliance with environmental regulations, Serve as a versatile tool for various applications, including research, industrial automation, and education are also part of the project objectives.

Workplace conditions (describe environment, layout and physical conditions – including access and egress)

This project is completed in AD103 under the supervision of Dulan Perera. The workplace is adequately equipped with essential amenities. This includes well-structured workbenches, conveniently placed electrical outlets, sufficient and appropriate lighting, and effective ventilation. These provisions are fundamental to facilitate electronics assembly, sensor testing, and coding activities. The workspace has been furnished with critical safety equipment such as fire extinguishers, first-aid kits, and eye protection gear. In addition to providing these safety essentials, clear and comprehensible safety protocols is established and communicated to all project team members. Adequate training on the safe handling of electrical components and chemicals is indispensable. An orderly inventory of electronic components, sensors, and tools has been maintained which is vital.

Hazards to consider

Electrical Hazards	Risk of electric shock or short circuits while working with electronic components.	Fire Hazard	Overheating or electrical faults in components can pose a fire hazard.	Physical Injury	Risk of physical injury, such as cuts or burns, when handling tools or equipment.

Chemical Exposure (Gas Sensor)	The BME680 sensor includes a gas sensor that may involve exposure to certain gases. Risk of inhaling or coming into contact with potentially harmful gases.	Inadequate Calibration and Testing	If the sensors are not correctly calibrated, the data collected may be inaccurate, which could lead to incorrect conclusions or actions.	Human Error	Mistakes made during assembly, wiring, or coding can result in equipment malfunction or data inaccuracies.
Data Privacy and Security	Risk of unauthorized access to sensor data, which may contain sensitive information.	Power Supply Issues	Disruptions in the power supply may lead to data loss and system downtime.	Budget and Resource Constraints	Overruns of the project budget may lead to resource constraints and potential project delays.
Environmental Impact	Improper disposal of electronic components and waste materials can harm the environment. Risk of releasing hazardous materials or contributing to electronic waste.	Exposure to Dust and Particles	When working with electronic components or conducting maintenance, there is a risk of exposure to dust and small particles that may irritate the respiratory system.	Handling of Sensors	The sensors themselves may have specific handling requirements that, if not followed, could lead to inaccurate readings or damage.

Step 2: Risk rating – risk matrix and definitions

		Consequence				
		Minor 1	Disruptive 2	Significant 3	Critical 4	Catastrophic 5
Likelihood	Almost Certain 5	Moderate 5	Major 10	High 15	Very High 20	Very High 25
	Likely 4	Moderate 4	Moderate 8	Major 12	High 16	Very High 20
	Possible 3	Low 3	Moderate 6	Major 9	Major 12	High 15
	Unlikely 2	Low 2	Moderate 4	Moderate 6	Moderate 8	Major 10
	Rare 1	Low 1	Low 2	Low 3	Moderate 4	Moderate 5

Likelihood	
Almost certain:	99% probability Could occur within 'days to months'

Consequence	
Catastrophic:	Multiple fatalities Multiple significant irreversible disabilities Systemic instances of mental health issues

Risk rating priority		
Risk rating	**Action**	**Recommended action time frame**

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Likely:	>50% probability Could occur within 'months to years'
Possible:	>10% probability May occur shortly but distinct probability it will not Could occur within 'the next three to five years'
Unlikely:	>1% probability May occur but not anticipated Could occur in 'five to ten years'
Rare:	<1% probability Occurrence requires exceptional circumstances Exceptionally unlikely even in the long term future Only occurs as a '100 year event'

Critical:	Single fatality Severe irreversible disabilities Widespread workforce stress or clusters of mental health issues affecting delivery of services and initiatives
Significant:	Long term injuries / disability Short term hospitalisation and rehabilitation Workforce stress or elevated levels of mental health issues affecting delivery of initiatives
Disruptive:	Injury requiring medical treatment Sustained lost time Mental health issues impacting delivery
Minor:	Injury requiring minimal medical treatment or first aid

High/Very high	Cease activity or isolate source of risk Implement further risk controls Monitor, review and document controls	Immediate Up to 1 month Ongoing
Major	Implement risk controls if reasonably practicable Monitor, review and document controls	Within 1 to 3 months Ongoing
Moderate	Implement risk controls if reasonably practicable Monitor, review and document controls	Within 3 to 6 months Ongoing
Low	Monitor and review	Ongoing

Step 3: Identify hazards and associated risk scores and controls

For a task or activity, list each step or For a health and safety issue, list the potential hazards	**Who can get harmed and how?**	***Uncontrolled risk score***	**Controls required**	**Residual risk score**	**Implementation of controls**		
					Person/s responsible	**Due Date**	**Indicate when completed**
Electrical Hazards	Team members handling electrical components may face the risk of electric shock or short circuits, potentially causing injuries. Inadequate safety measures can lead to electrical burns or injuries.	Likely-Disruptive (4-2) = 8	Proper training and handling of electrical components, following safety protocols, and using appropriate personal protective equipment (PPE).	Possible-Disruptive (3-2) = 6	**All team member**	**25/10/2023**	**26/10/2023**
Chemical Exposure (Gas Sensor)	Those handling the gas sensor may be exposed to harmful gases if proper precautions are not taken. Harm can include respiratory issues or chemical burns.	Likely-Disruptive (3-2) = 8	Follow safety data sheets (SDS) and guidelines for handling gases, work in a well-ventilated area, and use gas sensors in accordance with their specifications.	Unlikely-Disruptive (2-1) = 4	**All team member**	**25/10/2023**	**26/10/2023**

Data Privacy and Security	Failure to implement robust data security measures can result in unauthorized access, data breaches, or misuse of sensitive data. Harm can extend to privacy violations and legal consequences.	Likely-Significant (4-3) = 12	Implementing data encryption, access controls, and adhering to data security best practices.	Possible-Disruptive (3-2) = 6	**All team member**	**25/10/2023**	**26/10/2023**
Environmental Impact	Improper disposal of electronic components and waste materials can harm the environment. This can lead to environmental pollution and ecosystem damage.	Likely-Critical (4-4) = 16	Responsible disposal and recycling of electronic components, following environmental regulations and guidelines.	Possible-Significant (3-3) = 9	**All team member**	**25/10/2023**	**26/10/2023**
Fire Hazard	Overheating or electrical faults in components can pose a fire hazard. Inadequate fire safety measures and improper circuit design can lead to fires. The potential harm includes property damage, equipment loss, and safety risks to team members. Fire can result in severe injuries, damage to the workspace, and disruption of the project.	Possible-Minor (3-1) = 3	Fire safety measures, proper circuit design, and monitoring for overheating.	Possible-Disruptive (3-2) = 6	**All team member**	**25/10/2023**	**26/10/2023**
Inadequate Calibration and Testing	Failure to calibrate sensors properly may lead to inaccurate data. Inaccurate data can result in incorrect decisions or actions in environmental monitoring and research.	Possible-Significant (3-3) = 9	Rigorous testing and calibration procedures, regular sensor maintenance, and data validation.	Possible-Disruptive (3-2) = 6	**All team member**	**25/10/2023**	**26/10/2023**
Power Supply Issues	Disruptions in the power supply can result in data loss and system downtime, affecting data collection and research.	Likely-Critical (4-3) = 16	Implementing backup power sources and uninterruptible power supplies (UPS).	Possible-Disruptive (3-2) = 6	**All team member**	**25/10/2023**	**26/10/2023**
Exposure to Dust and Particles	Team members may be exposed to dust and small particles while handling electronic components, which may cause respiratory irritations or discomfort but usually have a lower impact.	Likely-Disruptive (3-2) = 8	Wearing appropriate respiratory protection and maintaining a clean workspace with proper ventilation.	Unlikely-Disruptive (2-1) = 4	**All team member**	**25/10/2023**	**26/10/2023**

Physical Injury	Project team members are at risk of physical injury, such as cuts or burns, when working with tools and equipment. These injuries can be the result of accidents during soldering, wiring, or handling tools.	Possible-Minor (3-1) = 3	Proper training in tool use, maintaining a clean and organized workspace, and wearing safety gear as appropriate.	Unlikely-Minor (2-1) = 2	**All team member**	**25/10/2023**	**26/10/2023**
Human Error	Mistakes made during sensor assembly, wiring, or coding can lead to equipment malfunction or data inaccuracies, potentially affecting project outcomes and data quality.	Likely-Critical (4-3) = 16	Training, quality control processes, and regular reviews of work.	Possible-Disruptive (3-2) = 6	**All team member**	**25/10/2023**	**26/10/2023**
Budget and Resource Constraints	Overrun of the project budget can lead to resource constraints, causing delays or an inability to complete the project. Harm extends to project management and team morale.	Possible-Significant (3-3) = 9	Careful budget planning, regular financial monitoring, and seeking additional funding sources if needed.	Possible-Minor (3-1) = 3	**All team member**	**25/10/2023**	**26/10/2023**
Handling of Sensors	The sensors themselves may have specific handling requirements that, if not followed, could lead to inaccurate readings or damage.	Likely-Significant (4-3) = 12	Carefully following manufacturer guidelines and documentation for sensor use and maintenance.	Possible-Disruptive (3-2) = 6	**All team member**	**25/10/2023**	**26/10/2023**

Step 4: Sign off and acceptance

Your signature below indicates you have read and understood the above risk assessment and will adhere to the controls at all times. Should any unexpected situation arise that hasn't been identified above, please seek assistance from your supervisor/manager contact immediately.

Name	Signature	*Date*		Name	Signature	*Date*
Md Redwan Ahmed Zawad	**Redwan**	***5/11/2023***				

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