

GRADE 8

MODULE 1: CODING & PROGRAMMING

Student Details

Name: _____

Class/Sec: _____

Date: _____

AI PROJECT: DECISION-BASED LED CONTROL SYSTEM (WORKSHEET)

THEORY

Artificial Intelligence (AI) is a technology that allows machines to **think, make decisions, and respond to inputs**.

One of the most important concepts in AI is **decision making using conditions**.
This means:

- If a condition is TRUE → action happens
- If a condition is FALSE → another action happens

This type of system is called a **rule-based AI system**.

In this project:

- **Input:** Button (user action)
- **Process:** Microcontroller checks condition (AI logic)
- **Output:** LED response

This follows the **Input → Process → Output model**, which is the foundation of AI systems.

Aim

To understand AI-based decision making using programming logic.

Components Required

- Microcontroller (Arduino / Raspberry Pi Pico)
 - LED
 - Resistor
 - Push Button
 - Breadboard
 - Connecting wires
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Procedure

- Connect LED and button to microcontroller
 - Apply decision logic
 - Upload program
 - Press button and observe output
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Connections

LED

- Anode → Digital Pin
- Cathode → GND via resistor

Button

- One side → 5V
 - Other side → Digital Pin
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System Concepts

- Input: Button
 - Process: Decision logic
 - Output: LED
-

Working Principle

When the button is pressed:

→ Condition becomes TRUE → LED ON

When the button is not pressed:

→ Condition becomes FALSE → LED OFF

Result

LED responds based on decision-making logic.

Learning Outcomes

- Understanding of AI decision making
 - Knowledge of condition-based logic
 - Input–Process–Output system
 - Basic automation concept
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GRADE 8

MODULE 2: ARTIFICIAL INTELLIGENCE (AI)

Student Details

Name: _____

Class/Sec: _____

Date: _____

AI PROJECT: IMAGE RECOGNITION SYSTEM (WORKSHEET)

THEORY

Artificial Intelligence (AI) enables machines to **learn from data and recognize patterns**.

One important branch of AI is **Image Recognition**, where a computer can identify objects, images, or gestures.

AI does not understand images like humans. Instead, it:

- Looks for patterns
 - Compares data
 - Makes decisions based on training
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◆ How AI Works in This Project

1. **Input:** Images (example: hand gestures or objects)
 2. **Process:** AI model is trained using examples
 3. **Output:** System predicts and identifies the image
-

◆ Training and Testing

- **Training:** Teaching AI using multiple examples
- **Testing:** Checking if AI gives correct output

This is called a **Machine Learning process**.

◆ Key Concepts

- Artificial Intelligence
 - Machine Learning
 - Training Data
 - Image Recognition
 - Pattern Detection
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◆ Real-Life Examples

- Face Unlock
 - Google Lens
 - Self-driving cars
 - Security systems
-

Aim

To understand how AI recognizes images using training data.

Requirements

- Computer / Laptop
 - Webcam
 - AI Tool (Teachable Machine or similar)
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Procedure

- Open AI tool
 - Create image classes
 - Add training images
 - Train the model
 - Test using webcam
-

System Concepts

- Input: Images
 - Process: AI model training
 - Output: Prediction result
-

Working Principle

The AI system learns patterns from images during training.

When a new image is shown, it compares with learned data and predicts the result.

Result

The system successfully identifies images based on trained data.

Learning Outcomes

- Understanding of AI and Machine Learning
 - Knowledge of training and testing
 - Concept of pattern recognition
 - Real-world AI applications
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GRADE 8

MODULE 3: ARTIFICIAL INTELLIGENCE (AI)

Student Details

Name: _____

Class/Sec: _____

Date: _____

AI + IoT PROJECT: SMART TEMPERATURE MONITORING SYSTEM (WORKSHEET)

THEORY

The **Internet of Things (IoT)** is a system where devices are connected to the internet and can send and receive data.

In IoT systems:

- Sensors collect data from the environment
- Microcontrollers process the data
- Data can be displayed or sent over the internet

When AI is combined with IoT, systems can:

- Analyze data
 - Make decisions
 - Respond automatically
-

◆ How this Project Works

In this project:

- **Input:** Temperature sensor data
- **Process:** Microcontroller reads and analyzes data
- **Output:** Temperature display / alert

This is a basic example of a **smart monitoring system**.

◆ Key Concepts

- Internet of Things (IoT)
 - Sensors and Data Collection
 - Data Processing
 - Smart Systems
 - AI + IoT Integration
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◆ Real-Life Examples

- Smart weather systems
 - Smart homes
 - Health monitoring devices
 - Industrial monitoring
-

Aim

To understand how IoT systems monitor and display environmental data.

Components Required

- Microcontroller (Arduino / Raspberry Pi Pico)
 - Temperature Sensor (DHT11 / similar)
 - Display (LCD / Serial Monitor)
 - Jumper wires
 - Breadboard
-

Procedure

- Connect temperature sensor to microcontroller
 - Read sensor data
 - Display output
 - Observe temperature changes
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Connections

Temperature Sensor

- VCC → Power
 - GND → Ground
 - Data → Digital Pin
-

System Concepts

- Input: Temperature data
 - Process: Data reading and analysis
 - Output: Display
-

Working Principle

The sensor measures temperature and sends data to the microcontroller.
The microcontroller processes the data and displays the result.

If combined with AI logic:

- High temperature → Alert
 - Normal temperature → No alert
-

Result

The system successfully reads and displays temperature data.

Learning Outcomes

- Understanding of IoT systems
 - Knowledge of sensors
 - Data monitoring concept
 - AI + IoT integration
 - Real-world applications
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GRADE 8

MODULE 4: ARTIFICIAL INTELLIGENCE (AI)

Student Details

Name: _____

Class/Sec: _____

Date: _____

AI PROJECT: BASIC DRONE SYSTEM UNDERSTANDING (WORKSHEET)

THEORY

A **drone** is an unmanned aerial vehicle (UAV) that can fly without a human pilot onboard. Drones are controlled using **remote systems, sensors, and intelligent programming**.

Modern drones use **Artificial Intelligence (AI)** to:

- Maintain balance
 - Avoid obstacles
 - Capture images
 - Make smart decisions
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◆ Main Parts of a Drone

- **Flight Controller:** Brain of the drone
 - **Motors:** Help the drone to fly
 - **Propellers:** Create lift
 - **Battery:** Provides power
 - **Sensors:** Help in stability and navigation
-

◆ How AI Works in Drones

AI helps drones to:

- Detect obstacles

- Maintain height (altitude)
 - Stabilize flight
 - Follow paths
-

◆ Working Principle

A drone works by rotating propellers at different speeds.
This creates lift and allows movement:

- Equal speed → Hover
 - More speed on one side → Movement
-

◆ Real-Life Applications

- Agriculture monitoring
 - Disaster management
 - Aerial photography
 - Delivery systems
-

Aim

To understand the basic working and components of a drone system.

Components (Basic Study)

- Drone frame
 - Motors
 - Propellers
 - Flight controller
 - Battery
 - Sensors
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Procedure

- Observe drone components
- Understand function of each part
- Study working principle
- Identify AI applications

System Concepts

- Input: Sensor data
 - Process: Flight controller (AI logic)
 - Output: Drone movement
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Working Principle

Sensors collect data about position and surroundings.

The flight controller processes data and adjusts motor speed.

This helps the drone:

- Stay stable
 - Move in different directions
 - Avoid obstacles
-

Result

Understanding of drone system and its intelligent working.

Learning Outcomes

- Knowledge of drone components
 - Understanding of AI in drones
 - Basics of flight control
 - Real-world applications
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GRADE 8

MODULE 5: ARTIFICIAL INTELLIGENCE (AI)

Student Details

Name: _____

Class/Sec: _____

Date: _____

AI PROJECT: 3D OBJECT DESIGN SYSTEM (WORKSHEET)

THEORY

3D Printing is a technology used to create real objects from digital designs. It builds objects **layer by layer** using materials like plastic (filament).

3D design is done using software like **Tinkercad**, where we create shapes and combine them to form objects.

◆ Role of AI in 3D Design

Artificial Intelligence (AI) helps in:

- Designing smart models
 - Improving accuracy
 - Automating design suggestions
 - Optimizing shapes
-

◆ How this Project Works

In this project:

- **Input:** Design idea (student creativity)
- **Process:** Creating model using software
- **Output:** 3D object (digital or printed)

◆ Key Concepts

- 3D Design
 - 3D Printing
 - Digital Modeling
 - Shape Combination
 - AI-assisted Design
-

◆ Real-Life Applications

- Toy making
 - Medical models
 - Engineering parts
 - Architecture models
-

Aim

To understand how to design simple 3D objects using digital tools.

Requirements

- Computer / Laptop
 - Tinkercad software
 - Internet connection
-

Procedure

- Open Tinkercad
 - Select basic shapes (cube, cylinder, sphere)
 - Combine shapes
 - Create simple design
 - Save the model
-

System Concepts

- Input: Design idea
 - Process: Digital modeling
 - Output: 3D model
-

Working Principle

The user creates a design using shapes.

The system converts the design into a 3D model.

If printed:

- The printer builds the object layer by layer
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Result

A 3D object is successfully designed using software.

Learning Outcomes

- Understanding of 3D design
 - Knowledge of modeling tools
 - Creativity and innovation
 - Basics of 3D printing
 - Introduction to AI-assisted design
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