**DeepSeek\_ICA\_Agent** Intelligent Cooperative Agents

This document is project description document to build an agent for cooperative physical simulation game GeoMates

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# GeoMates Agent Technical Specification

## Overview

GeoMates is a cooperative physical simulation game where agents interact with geometric objects in a physics-based environment. This document outlines the core concepts and specifications for developing an intelligent agent system.

GeoMates: A cooperative physical simulation game where two agents (disc and rectangle) collaborate to collect diamonds in a 2D environment.

**Environment**

* 2D physics engine
* Collision detection
* Platform mechanics
* Diamond collection system

**Learning System**

* Reinforcement learning framework
* State representation
* Reward function
* Policy optimization

**Implementation Plan**

**Phase 1: Core Systems**

1. Physics engine integration
2. Basic agent movement
3. Environment setup

**Phase 2: Agent Intelligence**

1. Perception system
2. Decision making
3. Action execution

**Phase 3: Cooperation**

1. Communication protocol
2. Coordination strategies
3. Task allocation

**Phase 4: Learning**

1. Training pipeline
2. Policy development
3. Performance metrics

**Success Metrics**

* Diamond collection rate
* Completion time
* Cooperation efficiency
* Adaptation to new configurations

**Timeline**

* Phase 1: CW 7 ( 10 Feb -16 Feb 2025)
* Phase 2: CW 8 ( 17 Feb -23 Feb 2025)
* Phase 3: CW 9 ( 24 Feb-2 March 2025)
* Phase 4: CW 10 ( 3 Mar -9 Mar 2025)
* Phase 5: CW 11 (10 Mar- 11 March 2025) – Agent (Source code ) Submission
* Phase 6: CW 12 (23 March 2025– Project report Submission

Following course topics will be used in development of Agents

**Problem Solving by Searching Problem Spaces**

* Path planning for agents
* Finding optimal routes to diamonds
* Collision avoidance strategies

**Knowledge Representation & Logic**

* Representing game state
* Modeling physical constraints
* Encoding agent capabilities

**Multi-Agent Systems (MAS)**

* Disc and rectangle agent cooperation
* Shared goal achievement
* Resource coordination

**PDDL and Planning**

* Action planning for diamond collection
* Sequencing movements
* Coordinating joint actions