00010101010101010010101010101010101010100010100101010101010101000001010101010100101010101010101010010101000000111001010100101010101010010100100101010100101010101010101001010000000010101010101010010101010101010101010100010100101010101010101000001010101010100101010101010101010010101000000111001010100101010101010010100100101010100101010101010101001010000000010101010101010010101010101010101010100010100101010101010101000001010101000101010101010100101010101010101010101000101001010101010101010000010101010101001010101010101010100101010000001110010101001010101010100101001001010101001010101010101010010100000000101010101010100101010101010101010101000101001010101010101010000010101010101001010101010101010100101010000001110010101001010101010100101001001010101001010101010101010010100000000101010101010100101010101010101010101000101001010101010101010000010101010101001000010101010101010010101010101010101010100010100101010101010101000001010101010100101010101010101010010101000000111001010100101010101010010100100101010100101010101010101001010000000010101010101010010101010101010101010100010100101010101010101000001010101010100101010101010101010010101000000111001010100101010101010010100100101010100101010101010101001010000000010101010101010010101010101010101010100010100101010101010101000001010101010100100101001000010101010101010010101010101010101010100010100101010101010101000001010101010100101010101010101010010101000000111001010100101010101010010100100101010100101010101010101001010000000010101010101010010101010101010101010100010100101010101010101000001010101010100101010101010101010010101000000111001010100101010101010010100100101010100101010101010101001010000000010101010101010010101010101010101010100010100101010101010101000001010101010100100101010010101010101010101010100010100101010101010101000001010101010100101010101010101010010101000000111001010100101010101010010100100101010100101010101010101001010000000010101010101010010101010101010101010100010100101010101010101000001010101010100101010101010101010010101000000111001010100101010101010010100100101010100101010101010101001010000000010101010101010010101010101010101010100010100101010101010101000001010101010100100101010010101010101010101010100010100101010101010101000001010101010100101010101010101010010101000000111001010100101010101010010100100101010100101010101010101001010000000010101010101010010101010101010101010100010100101010101010101000001010101010100101010101010101010010101000000111001010100101010101010010100100101010100101010101010101001010000000010101010101010010101010101010101010100010100101010101010101000001010101010100100101010010101010101010101010100010100101010101010101000001010101010100101010101010101010010101000000111001010100101010101010010100100101010100101010101010101001010000000010101010101010010101010101010101010100010100101010101010101000001010101010100101010101010101010010101000000111001010100101010101010010100100101010100101010101010101001010000000010101010101010010101010101010101010100010100101010101010101000001010101010100100101010101000001010101010100101

|  |
| --- |
| **IStrategizer AI Engine Design Document**  Agent Definition |

Table of Contents

[Conditions 3](#_Toc286583845)

[Supported Conditions 3](#_Toc286583846)

[Actions 4](#_Toc286583847)

[Supported Actions 4](#_Toc286583848)

[Future Actions 6](#_Toc286583849)

[Goals 6](#_Toc286583850)

[Supported Goals 6](#_Toc286583851)

[Goals Parameters 7](#_Toc286583852)

[Game State (Shallow Features) 7](#_Toc286583853)

[Game Meta-Data 8](#_Toc286583854)

[Game API 9](#_Toc286583855)

|  |  |  |
| --- | --- | --- |
| Conditions | | |
| Supported Conditions | | |
| \* Player Index is an implicit parameter | | |
| **Entity Class Exist** | | |
| Description | Check if a specific entity class is available | |
| Parameters | |  |  | | --- | --- | | Param#1 | Entity Class Id | | Param#2 | Amount | | |
| Result | |  |  | | --- | --- | | Res#1 | Entity Id | | |
| **Entity Object Exist** | | |
| Description | Check if a specific object is available | |
| Parameters | |  |  | | --- | --- | | Param#1 | Entity Object Id | | |
| **Check Entity Class Attribute** | | |
| Description | Check the status of a specific class attribute | |
| Parameters | |  |  | | --- | --- | | Param#1 | Entity Class Id | | Param#2 | Attribute Id | | Param#3 | Operator Id | | Param#4 | Value | | |
| Result | |  |  | | --- | --- | | Res#1 | Current Value | | |
| **Check Entity Object Attribute** | | |
| Description | Check the status of a specific object attribute | |
| Parameters | |  |  | | --- | --- | | Param#1 | Entity Object Id | | Param#2 | Attribute Id | | Param#3 | Operator Id | | Param#4 | Value | | |
| Result | |  |  | | --- | --- | | Res#1 | Current Value | | |
| **Research Exist** | | |
| Description | Check if a specific research is already done | |
| Parameters | |  |  | | --- | --- | | Param#1 | Research Id | | |
| **Resource Exist** | | |
| Description | Check if a certain amount of resource exists | |
| Parameters | |  |  | | --- | --- | | Param#1 | Resource Id | | Param#2 | Amount | | |
| Result | |  |  | | --- | --- | | Res#1 | Current Amount | | |
| **Check Filter Count** | | |
| Description | Check the number of members that belong to the provided filter. | |
| Parameters | |  |  | | --- | --- | | Param#1 | Filter Type Id | | Param#2 | Operator Id | | Param#3 | Value | | Param#4 | Abstract Location Id | | |
| Result | |  |  | | --- | --- | | Res#1 | Current Count | | |
| Actions | | |
| Supported Actions | | |
| \*Any parameter not mentioned in the action parameters and used in the conditions will be deduced by the engine | | |
| **Research** | | |
| Description | Make a specific research for a Unit Class | |
| Parameters | |  |  | | --- | --- | | Param#1 | Research Id | | |
| Conditions | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Preconditions | |  |  | | --- | --- | | Cond#1 | Entity Class Exist(Building Class Id, 1) | | Cond#2 | Foreach Required Resource: Resource Exist(Resource Id, Amount) | | Cond#3 | Foreach Required Research: Research Exist(Research Id) | | Cond#4 | Foreach Required Building Class: Entity Class Exist(Building Class Id) | | | Alive conditions | |  |  | | --- | --- | | Cond#1 | Entity Object Exist(Building Object Id) | | | Success conditions | |  |  | | --- | --- | | Cond#1 | Research Exist(Research Id) | | | |
| **Build** | | |
| Description | Build a specific building | |
| Parameters | |  |  | | --- | --- | | Param#1 | Worker Class Id | | Param#2 | Worker Class State Id | | Param#3 | Building Class Id | | Param#4 | Location Id | | |
| Conditions | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Preconditions | |  |  | | --- | --- | | Cond#1 | Entity Class Exist(Worker Class Id, 1) | | Cond#2 | Foreach Required Resource: Resource Exist(Resource Id, Amount) | | Cond#3 | Foreach Required Building Class: Entity Class Exist(Building Class Id) | | | Alive conditions | |  |  | | --- | --- | | Cond#1 | Entity Object Exist(Building Object Id) | | | Success conditions | |  |  | | --- | --- | | Cond#1 | Check Entity Object Attribute(Building Object Id, Building State, Equal, Built) | | | |
| **Train** | | |
| Description | Train a specific unit | |
| Parameters | |  |  | | --- | --- | | Param#1 | Unit Class Id | | Param#2 | Location Id | | |
| Conditions | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Preconditions | |  |  | | --- | --- | | Cond#1 | Entity Class Exist(Building Class Id, 1) | | Cond#2 | Foreach Required Resource: Resource Exist(Resource Id, Amount) | | Cond#3 | Foreach Required Research: Research Exist(Research Id) | | Cond#4 | Foreach Required Building Class: Entity Class Exist(Building Class Id) | | | Alive conditions | |  |  | | --- | --- | | Cond#1 | Entity Object Exist(Building Object Id) | | | Success conditions | |  |  | | --- | --- | | Cond#1 | Check Entity Object Attribute(Unit Object Id, State, Equal, Idle) | | | |
| **Attack Ground** | | |
| Description | Attack at a specific location | |
| Parameters | |  |  | | --- | --- | | Param#1 | Unit Class Id | | Param#2 | Abstract Location Id | | |
| Conditions | |  |  |  |  | | --- | --- | --- | --- | | Preconditions | |  |  | | --- | --- | | Cond#1 | Entity Class Exist(Unit Class Id, 1) | | | Alive conditions | |  |  | | --- | --- | | Cond#1 | Entity Object Exist(Unit Object Id) | | | Success conditions | |  |  | | --- | --- | | Cond#1 | Entity Object Exist(Unit Object Id) | | Cond#2 | Check Entity Object Attribute(Unit Object Id, Current Concrete Location, Equal, Target Concrete Location) | | | |
| **Attack Entity** | | |
| Description | Attack a specific entity | |
| Parameters | |  |  | | --- | --- | | Param#1 | Unit Class Id | | Param#2 | Target Entity Class Id | | Param#3 | Target Entity Abstract Location Id | | Param#4 | Player Id | | |
| Conditions | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Preconditions | |  |  | | --- | --- | | Cond#1 | Entity Class Exist(Unit Class Id, 1) | | Cond#2 | Entity Class Exist(Target Entity Class Id, 1) | | Cond#3 | Check Entity Object Attribute(Target Entity Object Id, Current Target Entity Abstract Location Id, Equal, Target Entity Abstract Location Id) | | | Alive conditions | |  |  | | --- | --- | | Cond#1 | Entity Object Exist(Unit Object Id) | | Cond#2 | Entity Object Exist(Target Entity Object) | | Cond#3 | Check Entity Object Attribute(Target Entity Object Id, Current Target Entity Abstract Location Id, Equal, Target Entity Abstract Location Id) | | | Success conditions | |  |  | | --- | --- | | Cond#1 | Entity Object Exist(Unit Object Id) | | Cond#2 | Check Entity Object Attribute(Target Entity Object Id, Current Health, Less Than, Old Health) | | | |
| **Move** | | |
| Description | Moves a unit to a specific location | |
| Parameters | |  |  | | --- | --- | | Param#1 | Entity Object Id | | Param#2 | Entity Concrete Location | | |
| Conditions | |  |  |  |  | | --- | --- | --- | --- | | Preconditions | |  |  | | --- | --- | | Cond#1 | Entity Object Exist(Entity Object Id) | | | Alive conditions | |  |  | | --- | --- | | Cond#1 | Entity Object Exist(Entity Object Id) | | | Success conditions | |  |  | | --- | --- | | Cond#1 | Entity Object Exist(Entity Object Id) | | Cond#2 | Check Entity Object Attribute(Entity Object Id, Concrete Position, Equals, Entity Concrete Location) | | | |
| Future Actions | | |
| Move: move a Unit Class to a specific location  Cancel: cancel a train or build  Repair: repairs a specific Unit Class  Sell: sell a Unit Class or item  Cast: use a specialized skill (e.g spell)  Gather: gather a collectable asset | | |
| Goals | | |
| Supported Goals | | |
| **Win Game** | | |
| Description | Win a Wargus game using a specific strategy | |
| Parameters | |  |  | | --- | --- | | Param#1 | Strategy Type Id | | |
| Success Conditions | Foreach Entity Class: Check Entity Class Attribute(Entity Class Id, Count, Equal, Zero) | |
| **Build Base** | | |
| Description | Build a city needed to train forces | |
| Parameters | |  |  | | --- | --- | | Param#1 | Base Type Id | | |
| Success Conditions | If Base Type Id == Early Game Base  Entity Class Exist (Great Hall Class Id, 1)  Entity Class Exist (Barrack Class Id, 1)  If Base Type Id == Late Game Base  Entity Class Exist (Stronghold Class Id, 1)  Entity Class Exist (Ogre Mound Class Id, 1)  Entity Class Exist (Black-Smith Class Id, 1)  Entity Class Exist (Troll Lumber Mill Class Id, 1) | |
| **Train Force** | | |
| Description | Train a force with a specific size | |
| Parameters | |  |  | | --- | --- | | Param#1 | Force Size Id | | |
| Success Conditions | If Force Size Id == Tiny  return Check Filter Count(Attacking Unit Filter, Equal, 2, Any Location)  If Force Size Id == Small  return Check Filter Count(Attacking Unit Filter, Equal, 5, Any Location)  .  .  If Force Size Id == Gigantic  return Check Filter Count(Attacking Unit Filter, Equal, 25, Any Location) | |
| **Attack Enemy** | | |
| Description | Attack the enemy using a specific attack strategy and goal | |
| Parameters | |  |  | | --- | --- | | Param#1 | Attack Type Id | | Param#2 | Force Size | | Param#3 | Target Player Id | | |
| Preprocessing | Entity Id = Random(Enemy Entities Id) | |
| Alive Conditions | Check Filter Count(Any Unit Filter, Greater Than, 0, Enemy Colony) | |
| Success Conditions | If Attack Type == Defeat  return Check Filter Count(Any Unit Filter, Equal, 0, Enemy Colony)  If Attack Type == Attrition  Enemy Entities = Filter Entity (Enemy Colony)  return Current Count[Enemy Entities] < Old Count[Enemy Entities] | |
| Goals Parameters | | |
| **Strategy Type** | | |
| Description | The strategy by which the computer play | |
| Strategies | |  |  | | --- | --- | | Early Tier Rush | Make light units quickly and perform a fast rush | | Middle Tier Rush | Build minimum units to reach tier 2, and perform a heavy units rush | | |
| **Base Type** | | |
| Description | Build a city needed to train forces | |
| Tiers | |  |  | | --- | --- | | Tier 1 | The available units and buildings in tech-tree tier 1 that allow player to advance to Tier 2 | | Tier 2 | The available units and buildings in tech-tree tier 2 that allow player to advance to Tier 2 | | Tier 3 | The available units and buildings in tech-tree tier 3 that allows the player to build a complex city and army | | |
| **Force Size Type** | | |
| Description | Train a force with a specific size | |
| Sizes | |  |  | | --- | --- | | Unary | Force of size 1 unit | | Tiny | Force of size 2 units | | Small | Force of size 5 units | | Medium | Force of size 7 units | | Big | Force of size 10 units | | Large | Force of size 15 units | | Huge | Force of size 20 units | | Gigantic | Force of size 25 units | | |
| **Attack Type** | | |
| Description | Defeat the enemy by killing all its units | |
| Types | |  |  | | --- | --- | | Defeat | Kill and destroy all enemy units and buildings | | Attrition | Kill and destroy at least 1 enemy unit or building | | |
| Game State (Shallow Features) | | |
| PlayerNumberOfBuildings  PlayerIsBeingAttacked  PlayerIsAttackingTheEnemy  PlayerIsBuildingAnyDefensiveUnit  PlayerIsUpgradingArmorStuff  PlayerIsUpgradingTowers  PlayerIsBuildingAnyAttackingUnit  PlayerIsUpgradingOtherMilitaryStuff  PlayerIsBuildingTownCenter  PlayerIsUpgradingTownCenters  PlayerIsBuildingAnyNonMilitaryBuilding  PlayerNumberOfFarmsBuilding  PlayerNumberOfBarracksBuilding  PlayerNumberOfBlackSmithBuilding  PlayerNumberOfOrgeMoundBuilding  PlayerNumberOfTrollLumberMillBuilding  PlayerNumberOfTownHallBuilding  PlayerHasStrongHold  PlayerHasFortress  PlayerKills  PlayerNumberOfAttackingUnits  PlayerDestroys  GruntsCount  PeonsCount  CatapultCount  OgreCount  AxeThrowerCount  DragonCount  WatchTowerCount  DragonRoostCount  GuardTowerCount  CanonTowerCount  AlterOfStormsCounts  GoldAmount  WoodAmount | | |
| Game Meta-Data | | |
| **Attacking Units Class** | | |
| Description | |  |
| String Identifier | | |  | | --- | | unit-grunt | | unit-catapult | | unit-ogre | | unit-axethrower | | unit-death-knight | | unit-ogre-mage | | unit-berserker | | unit-evil-knight | | unit-dragon | |
| **Resource Type** | | |
| Description | | Defines resources used by the engine and corresponds to game resources |
| Types | | |  | | --- | | Gold | | Wood | | Food | |
| **Player Type** | | |
| Description | | Defines all kind of players |
| Types | | |  |  | | --- | --- | | AI Engine Bot | The AI Engine playing agent | | P1 | First non-engine player | | P2 | Second non-engine player | |
| **Unit Type** | | |
| Description | |  |
|  | |  |
| **Abstract Position** | | |
| Description | |  |
|  | |  |
| **Object Attributes** | | |
| Description | | Defines the attributes of any game object |
| Attributes | | |  |  | | --- | --- | | State | The state of an entity | | Concrete Location | The location of an entity in terms of coordinates | | Abstract Location | The location of an entity abstracted from the map, it is a kind of descriptive location | | Health | The current health of an entity | |
| **Class Attributes** | | |
| Description | | Defines the attributes of any game class |
| Attributes | | |  |  | | --- | --- | | Count | The number of objects in the game belonging to that class | |
| **Entity Filters** | | |
| Description | | Defines the filters used to categorize game entities |
| Attributes | | |  |  | | --- | --- | | Attacking Units | Any unit that can attack | |
| **Comparison Operator** | | |
| Description | | Defines the operators used for condition checking |
| Operators | | |  |  | | --- | --- | | Less Than | < | | Less Equal | <= | | Greater Than | > | | Greater Equal | >= | | Equal | = | | Not Equal | != | |
| **Object State** | | |
| Description | | Defines different states of game objects |
| States | | |  |  | | --- | --- | | Pending Construction | Entity is in the waiting queue waiting a construction order to be issued physically in the game (e.g a worker is assigned a building to build and is moving toward its build position to build it) | | During Construction | Entity is being constructed and not ready yet (e.g building is being built by a worker) | | Idle | Entity is in a neutral state | | Busy | Entity is busy doing a command (e.g building is training a unit, or a unit is moving to a location) | |
| Game API | | |
| \*All game API functions returns an integer indicating a certain predefined error if occurred | | |
| **Get Required Resources** | | |
| Description | | Get all the required resources for training a unit building or building a building |
| Parameters | | |  |  | | --- | --- | | Param#1 | Entity Id | |
| Returns | | A structure containing the amount of each resource required |
| **Get Required Buildings** | | |
| Description | | Get all the required buildings for training a unit building or building a building |
| Parameters | | |  |  | | --- | --- | | Param#1 | Entity Id | |
| Returns | | Set of all required building |
| **Get Entity Class Attribute** | | |
| Description | | Get the value of a certain class attribute |
| Parameters | | |  |  | | --- | --- | | Param#1 | Entity Class Id | | Param#2 | Attribute Id | |
| Returns | | Attribute value |
| **Get Entity Object Attribute** | | |
| Description | | Get the value of a certain object attribute |
| Parameters | | |  |  | | --- | --- | | Param#1 | Entity Object Id | | Param#2 | Attribute Id | |
| Returns | | Attribute value |
| **Get Source Building** | | |
| Description | | Get the building which train a unit or has an upgrade |
| Parameters | | |  |  | | --- | --- | | Param#1 | Entity Class Id | |
| Returns | | Building Class Id |
| **Get Object** | | |
| Description | | Get the id of an instance of a given entity class |
| Parameters | | |  |  | | --- | --- | | Param#1 | Entity Class Id | |
| Returns | | Entity Object Id |

# Goal Ontology