**DM2242 ARTIFICIAL INTELLIGENCE IN GAMES A1**

**Ling Guan Yu (193541T, NYP SIDM GDT 1904)**

**State Tables**

**Skeleton**

|  |  |  |  |
| --- | --- | --- | --- |
| **Current State** | **State Description** | **State Transition** | **Next State** |
| StateSkeleDead | Skeleton is dead (really dead). Skeleton slowly fades away. | N.A. | N.A. |
| StateSkeleDeadButNotDead | Skeleton is dead but not really. Skeleton can revive after a certain amount of time if not destroyed in this state | Current health of skeleton <= 0.0f | StateSkeleDead |
| Time left <= 0.0f (revival period is over) && its next state is not StateSkeleDead | StateSkeleIdle |
| StateSkeleIdle | Skeleton stays still at its current position and changes facing direction randomly | Current health of skeleton <= 0.0f | StateSkeleDeadButNotDead |
| Its nearest enemy is 1 grid cell away from it && its next state is not StateSkeleDeadButNotDead | StateSkeleAttack |
| It is free to move && its nearest enemy is 5 or less grid cells away from it && its next state is neither StateSkeleDeadButNotDead nor StateSkeleAttack | StateSkeleChase |
| It is free to move && its next state is not StateSkeleDeadButNotDead, not StateSkeleAttack and not StateSkeleChase | StateSkelePatrol |
| StateSkelePatrol | Skeleton moves around randomly and only can move to valid grid cells | Current health of skeleton <= 0.0f | StateSkeleDeadButNotDead |
| Its nearest enemy is 5 or less grid cells away from it && its next state is not StateSkeleDeadButNotDead | StateSkeleChase |
| It fails to choose a valid direction to move in && its next state is neither StateSkeleDeadButNotDead nor StateSkeleChase | StateSkeleIdle |
| StateSkeleChase | Skeleton chases down its nearest enemy | Current health of skeleton <= 0.0f | StateSkeleDeadButNotDead |
| Its nearest enemy cannot be found || (Its nearest enemy is more than 5 grid cells away from it && its next state is not StateSkeleDeadButNotDead) | StateSkelePatrol |
| It is not free to move && its next state is neither StateSkeleDeadButNotDead nor StateSkelePatrol | StateSkeleIdle |
| Its nearest enemy is 1 grid cell away from it && its next state is not StateSkeleDeadButNotDead, not StateSkelePatrol and not StateSkeleIdle | StateSkeleAttack |
| StateSkeleAttack | Skeleton attacks its nearest enemy | Current health of skeleton <= 0.0f | StateSkeleDeadButNotDead |
| Its nearest enemy cannot be found && its next state is not StateSkeleDeadButNotDead | StateSkelePatrol |
| (Its nearest enemy is dead || its nearest enemy is not 1 grid cell away from it) && its next state is neither StateSkeleDeadButNotDead nor StateSkelePatrol | StateSkeleChase |

**Reptile**

|  |  |  |  |
| --- | --- | --- | --- |
| **Current State** | **State Description** | **State Transition** | **Next State** |
| StateReptileDead | Reptile is dead. Reptile slowly fades away. | N.A. | N.A. |
| StateReptileIdle | Reptile stays still at its current position and changes facing direction randomly | Current health of reptile <= 0.0f | StateReptileDead |
| Its nearest enemy is 1 grid cell away from it && its next state is not StateReptileDead | StateReptileAttack |
| It is free to move && its nearest enemy is 6 or less grid cells away from it && its next state is neither StateReptileDead nor StateReptileAttack | StateReptileChase |
| It is free to move && its next state is not StateReptileDead, not StateReptileAttack and not StateReptileChase | StateReptilePatrol |
| StateReptilePatrol | Reptile moves around in a direction that is either of 2 randomly selected orthogonal valid directions common among all other reptiles | Current health of reptile <= 0.0f | StateReptileDead |
| Its nearest enemy is 6 or less grid cells away from it && its next state is not StateReptileDead | StateReptileChase |
| It does not have a common valid direction to move in && its next state is neither StateReptileDead nor StateReptileChase | StateReptileIdle |
| StateReptileChase | Reptile chases down its nearest enemy | Current health of reptile <= 0.0f | StateReptileDead |
| Its nearest enemy cannot be found || (Its nearest enemy is more than 6 grid cells away from it && its next state is not StateReptileDead) | StateReptilePatrol |
| It is not free to move && its next state is neither StateReptileDead nor StateReptilePatrol | StateReptileIdle |
| Its nearest enemy is 1 grid cell away from it && its next state is not StateReptileDead, not StateReptilePatrol and not StateReptileIdle | StateReptileAttack |
| StateReptileAttack | Reptile attacks its nearest enemy | Current health of reptile <= 0.0f | StateReptileDead |
| Its nearest enemy cannot be found && its next state is not StateReptileDead | StateReptilePatrol |
| (Its nearest enemy is dead || its nearest enemy is not 1 grid cell away from it) && its next state is neither StateReptileDead nor StateReptilePatrol | StateReptileChase |
| Hit the 5% chance when switching between attack cooldown and attack interval | StateReptileProcreate |
| StateReptileProcreate | Reptile will reproduce if and only if there is a valid grid cell to spawn a new reptile in. New reptile spawns in an empty grid cell 1 grid cell away from “parent” reptile | Current health of reptile <= 0.0f | StateReptileDead |
| Procreation is complete | StateReptileAttack |

**Boy**

|  |  |  |  |
| --- | --- | --- | --- |
| **Current State** | **State Description** | **State Transition** | **Next State** |
| StateBoyDead | Boy is dead. Boy slowly fades away. | N.A. | N.A. |
| StateBoyIdle | Boy stays still at its current position and changes facing direction randomly | Current health of boy <= 0.0f | StateBoyDead |
| Its nearest enemy is 1 grid cell away from it && its next state is not StateBoyDead | StateBoyAttack |
| It is free to move && its nearest enemy is 4 or less grid cells away from it && its next state is neither StateBoyDead nor StateBoyAttack | StateBoyChase |
| It is free to move && its next state is not StateBoyDead, not StateBoyAttack and not StateBoyChase | StateBoyPatrol |
| StateBoyPatrol | Boy moves around randomly and might stop to look around sometimes | Current health of boy <= 0.0f | StateBoyDead |
| Its nearest enemy is 4 or less grid cells away from it && its next state is not StateBoyDead | StateBoyChase |
| (Hit the 25% chance || it does not have a valid direction to move in) && its next state is neither StateBoyDead nor StateBoyChase | StateBoyIdle |
| StateBoyChase | Boy chases down its nearest enemy | Current health of boy <= 0.0f | StateBoyDead |
| Its nearest enemy cannot be found || (Its nearest enemy is more than 4 grid cells away from it && its next state is not StateBoyDead) | StateBoyPatrol |
| It is not free to move && its next state is neither StateBoyDead nor StateBoyPatrol | StateBoyIdle |
| Its nearest enemy is 1 grid cell away from it && its next state is not StateBoyDead, not StateBoyPatrol and not StateBoyIdle | StateBoyAttack |
| StateBoyAttack | Boy attacks its nearest enemy | Current health of boy <= 0.0f | StateBoyDead |
| Its nearest enemy cannot be found && its next state is not StateBoyDead | StateBoyPatrol |
| (Its nearest enemy is dead || its nearest enemy is not 1 grid cell away from it) && its next state is neither StateBoyDead nor StateBoyPatrol | StateBoyChase |
| Hit the 10% chance when switching between attack cooldown and attack interval | StateBoyImmune |
| StateBoyImmune | Boy is immune to damage for a period of time. This is useful for diverting enemy attacks from other friendly units | Immune time runs out | StateBoyAttack |

**Orc**

|  |  |  |  |
| --- | --- | --- | --- |
| **Current State** | **State Description** | **State Transition** | **Next State** |
| StateOrcDead | Orc is dead. Orc slowly fades away. | N.A. | N.A. |
| StateOrcExplosive | Orc becomes a “bomb”. It does splash damage to entities above, below, to the left and to the right of it when destroyed. | Current health of orc <= 0.0f || Being-A-Bomb time runs out | StateOrcDead |
| StateOrcIdle | Orc stays still at its current position and changes facing direction randomly | Current health of orc <= 0.0f | StateOrcExplosive |
| Its nearest enemy is 1 grid cell away from it && its next state is not StateOrcExplosive | StateOrcAttack |
| It is free to move && its nearest enemy is 3 or less grid cells away from it && its next state is neither StateOrcExplosive nor StateOrcAttack | StateOrcChase |
| It is free to move && its next state is not StateOrcExplosive, not StateOrcAttack and not StateOrcChase | StateOrcPatrol |
| StateOrcPatrol | Orc moves a step forward in a random direction, then stops for a while when it reaches its destination. This is a cycle that repeats. | Current health of orc <= 0.0f | StateOrcExplosive |
| Its nearest enemy is 3 or less grid cells away from it && its next state is not StateOrcExplosive | StateOrcChase |
| (It fails to choose a valid direction to move in || it was moving 1 step before) && its next state is neither StateOrcExplosive nor StateOrcChase | StateOrcIdle |
| StateOrcChase | Orc chases down its nearest enemy | Current health of orc <= 0.0f | StateOrcExplosive |
| Its nearest enemy cannot be found || (Its nearest enemy is more than 3 grid cells away from it && its next state is not StateOrcExplosive) | StateOrcPatrol |
| It is not free to move && its next state is neither StateOrcExplosive nor StateSkelePatrol | StateOrcIdle |
| Its nearest enemy is 1 grid cell away from it && its next state is not StateOrcExplosive, not StateOrcPatrol and not StateOrcIdle | StateOrcAttack |
| StateOrcAttack | Orc attacks its nearest enemy | Current health of orc <= 0.0f | StateOrcExplosive |
| Its nearest enemy cannot be found && its next state is not StateOrcExplosive | StateOrcPatrol |
| (Its nearest enemy is dead || its nearest enemy is not 1 grid cell away from it) && its next state is neither StateOrcExplosive nor StateOrcPatrol | StateOrcChase |