

EECS3311 Software Design (Fall 2020)

Q&A - Project

Friday, November 20

How Enemies Act

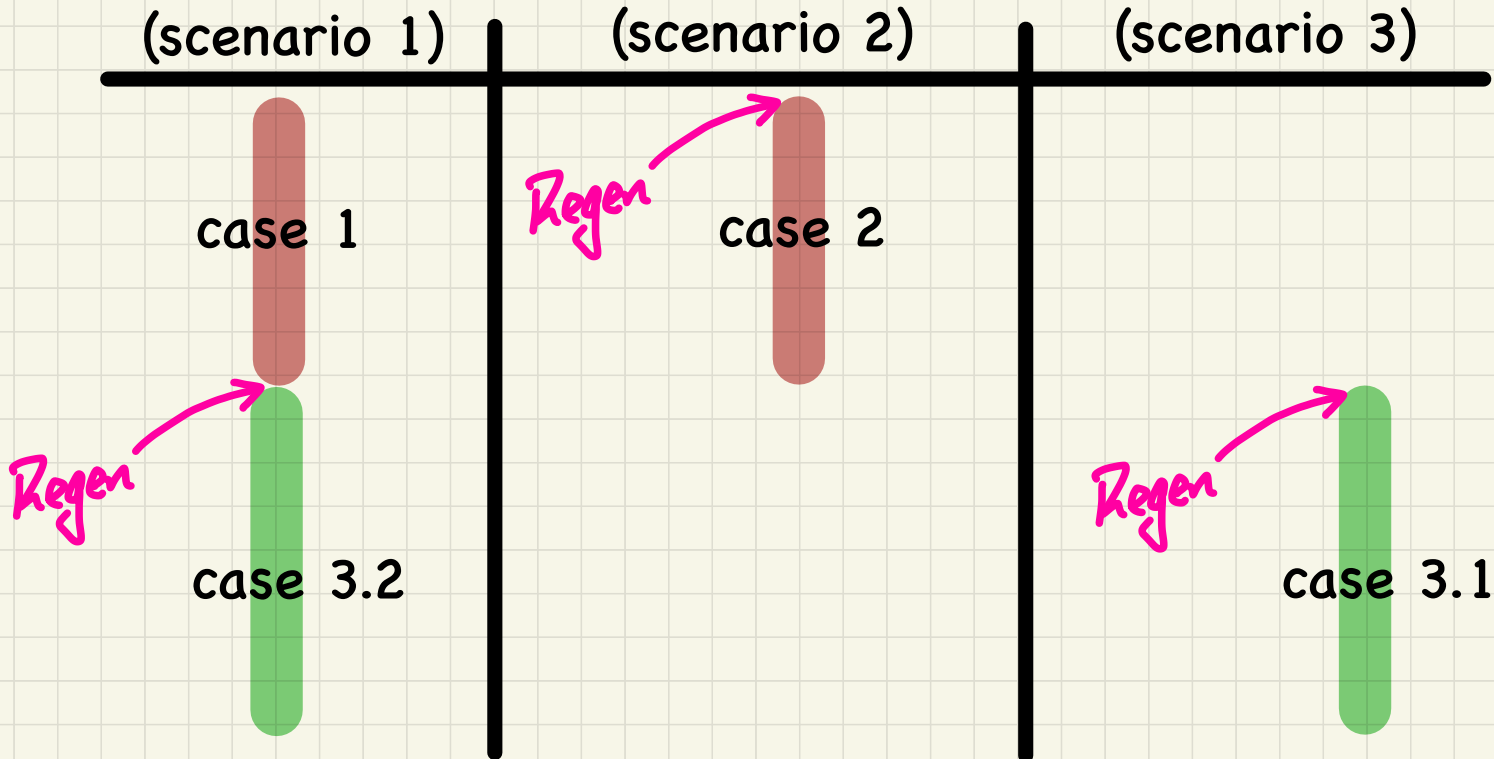
[References](#)

[Section 7: Enemy Action in messages.txt](#)

[Section 6.13.5 Phase 5: Enemies Act in instructions PDF](#)

Phase 1: Preemptive Actions

Phase 2: Non-Preemptive Actions (Starfighter seen or not)



Name: Grunt, Health:100, Regen:1, Armour:1, Vision:5.

PI | **Preemptive Action:** If the Starfighter passes, increase both current health and total health by 10. If the Starfighter uses a special, increase current health and total health by 20. Turn does not end in both cases.

PZ | **Action when Starfighter is not seen:** Moves 2 spaces left. If the Grunt is still on the board and is not destroyed, fire a projectile which spawns directly to the left of the Grunt. The spawned projectile moves left 4 spaces per turn and has a base damage of 15.

PZ | **Action when Starfighter is seen:** Moves 4 spaces left. If the Grunt is still on the board and is not destroyed, fire a projectile which spawns directly to the left of the Grunt. The spawned projectile moves left 4 spaces per turn and has a base damage of 15.

Interceptor

→ fire

regen →

PI

regen → PZ

Name: Interceptor, Health:50, Regen:0, Armour:0, Vision:5.

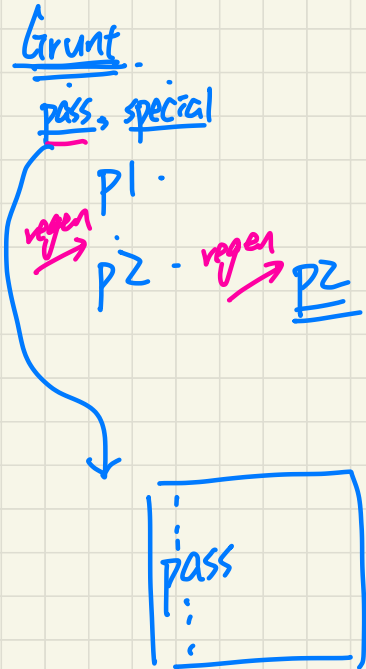
PI | **Preemptive Action:** If the Starfighter fires, **attempt** to move the Interceptor vertically directly to the row the Starfighter is in before ending the Interceptor's turn. More precisely about the vertical movement:

- **Case 1.** If the Interceptor and the Starfighter are in different columns, then:
 - ◇ If the path to the row where the Starfighter is in is clear, then then move to that row (without colliding with the Starfighter).
 - ◇ If there is at least one occupying enemy blocking the path, move as close to the first one (so as to avoid a collision). Along the way to this first occupying enemy, the Interceptor may collide with projectiles.
 - ◇ If there is no occupying enemy blocking the path, but there is one or more occupying projectiles then the Interceptor collides with those projectiles.
- **Case 2.** If the Interceptor and the Starfighter are in the same column, then:
 - ◇ If the path to the Starfighter's location is clear, then collide with the Starfighter.
 - ◇ If there is at least one occupying enemy blocking the path, move as close to the first one (so as to avoid a collision). Along the way to this first occupying enemy, the Interceptor may collide with projectiles.
 - ◇ If there is no occupying enemy blocking the path, but there is one or more occupying projectiles then the Interceptor collides with those projectiles before it may collide with the Starfighter.

Note for Case 1 and Case 2. The Interceptor may be destroyed along the path, due to collisions with projectiles, in which case it is just removed from the board without continuing moving along the path.

PZ | **Action when Starfighter is not seen:** Moves 3 spaces left.

PZ | **Action when Starfighter is seen:** Moves 3 spaces left.



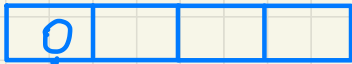
PZ

Scoring (1)

Enemy's Orb or Focus

0 Grunt - silver orb
2 points

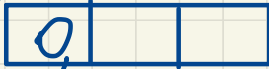
Carrier



x 3

gold orb
3 points

Bylon

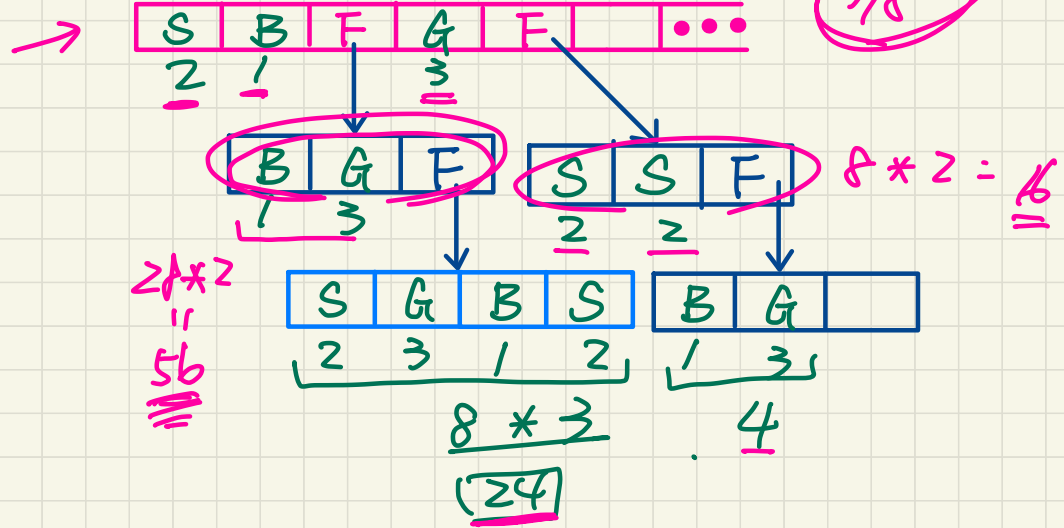


x 2

bronze orb
1 point

Stratfighter's Focus

of children at each level (except top) ≥ 3 or ≤ 4 unlimited.

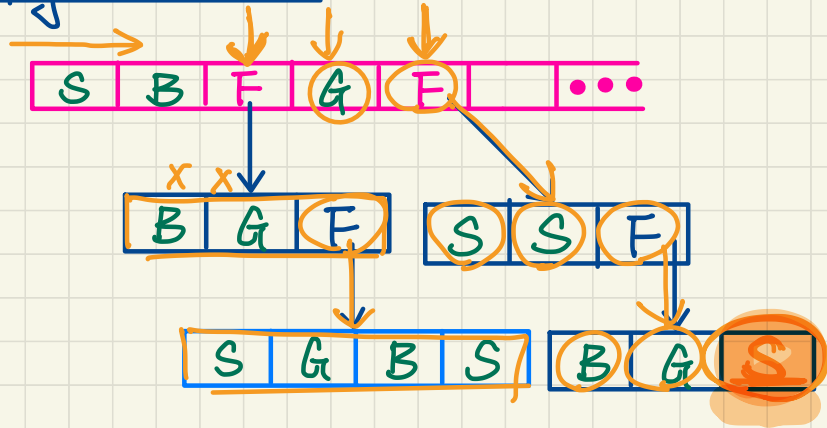


Scoring (2)

Enemy's Orb or Focus

S Grunt - silver orb
2 points

Straightener's Focus

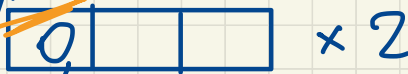


Carrier



gold orb
3 points

Rybn



bronze orb
1 point

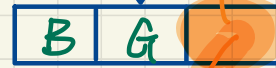
- When a Grunt gets destroyed

Scoring (3)

Enemy's Orb or Focus

0 Grunt - silver orb
2 points

Straightener's Focus



F

1st free slot.



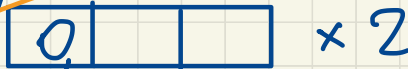
Carrier



gold orb

3 points

Rybn




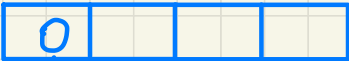
bronze orb
1 point

- When a Carrier gets destroyed

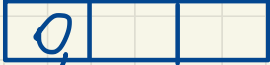
Scoring (4)

Enemy's Orb or Focus

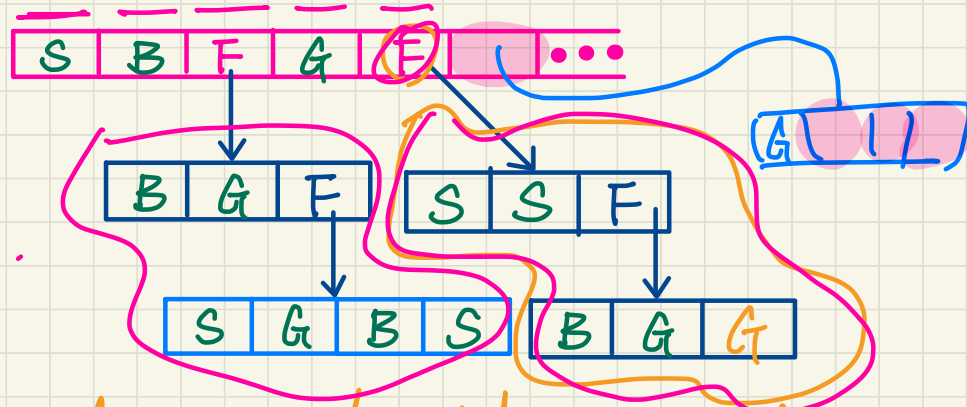
 Grunt - silver orb
2 points

Carrier
 x 3

gold orb
3 points

Byron
 x 2
bronze orb
1 point

Straightener's Focus



Grunt is destroyed.

Carrier is destroyed.

no free slot

- When a Carrier gets destroyed

Acceptance Test at015

Part 1 of 8

```
state:not started, normal, ok
Welcome to Space Defender Version 2.
->play(10,30,40,40,40,101,101)
state:weapon setup, normal, ok
1:Standard (A single projectile is fired in front)
  Health:10, Energy:10, Regen:0/1, Armour:0, Vision:1, Move:1, Move Cost:1,
  Projectile Damage:70, Projectile Cost:5 (energy)
2:Spread (Three projectiles are fired in front, two going diagonal)
  Health:0, Energy:60, Regen:0/2, Armour:1, Vision:0, Move:0, Move Cost:2,
  Projectile Damage:50, Projectile Cost:10 (energy)
3:Snipe (Fast and high damage projectile, but only travels via teleporting)
  Health:0, Energy:100, Regen:0/5, Armour:0, Vision:10, Move:3, Move Cost:0,
  Projectile Damage:1000, Projectile Cost:20 (energy)
4:Rocket (Two projectiles appear behind to the sides of the Starfighter and accelerates)
  Health:10, Energy:0, Regen:10/0, Armour:2, Vision:2, Move:0, Move Cost:3,
  Projectile Damage:100, Projectile Cost:10 (health)
5:Splitter (A single mine projectile is placed in front of the Starfighter)
  Health:0, Energy:100, Regen:0/10, Armour:0, Vision:0, Move:0, Move Cost:5,
  Projectile Damage:150, Projectile Cost:70 (energy)
Weapon Selected:Standard
->toggle_debug_mode
state:weapon setup, debug, ok
In debug mode.
```

more likely to spawn an interceptor.

for the very first

[1,39]

[40,100]

An enemy is always spawned, more likely an Interceptor than Grunt.

[1,40] *[40,40]* *[40,40]* *[40,101]* *[101,101]* *[101,101]*

G F C I P

↳ an enemy is always spawned.

See p.8 of instructions.


```
->setup_next(5)
state:in game(0.0), debug, ok
Starfighter:
  [0,S]->health:70/70, energy:70/70, Regen:1/3, Armour:1, Vision:13, Move:10, Move Cost:3, location:[E,1]
  Projectile Pattern:Standard, Projectile Damage:70, Projectile Cost:5 (energy)
  Power:Recall (50 energy): Teleport back to spawn.
  score:0
Enemy:
Projectile:
Friendly Projectile Action:
Enemy Projectile Action:
Starfighter Action:
Enemy Action:
Natural Enemy Spawn:
  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
A _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
B _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
C _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
D _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
E S _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
F _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
G _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
H _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
I _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
J _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
```

Reference: See values of attributes in messages.txt

Acceptance Test at015

Part 3 of 8

```

state:in game(0.0), debug, ok
Starfighter:
[0,S]->health 70/70, energ:70/70, Regen:1/3, Armour:1, Vision:13, Move:10, Move Cost:3, location:[E,1]
Projectile Pattern:Standard, Projectile Damage:70, Projectile Cost:5 (energy)
Power:Recall (50 energy): Teleport back to spawn.
score:0
Enemy:
Projectile:
Friendly Projectile Action:
Enemy Projectile Action:
Starfighter Action:
Enemy Action:
Natural Enemy Spawn:
  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
A _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
B _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
C _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
D _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
E S _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
F _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
G _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
H _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
I _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
J _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

```

- projectiles move
- Energy regen done before pass
- Enemies act
- Enemy spawn

->pass

```

state:in game(1.0), debug, ok
Starfighter:
[0,S]->health 70/70, energy 70/70, Regen:1/3, Armour:1, Vision:13, Move:10, Move Cost:3, location:[E,1]
Projectile Pattern:Standard, Projectile Damage:70, Projectile Cost:5 (energy)
Power:Recall (50 energy): Teleport back to spawn.
score:0
Enemy:
[1,G]->health:100/100, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,30]
Projectile:
Friendly Projectile Action:
Enemy Projectile Action:
Starfighter Action:
The Starfighter(id:0) passes at location [E,1], doubling regen rate.
Enemy Action:
Natural Enemy Spawn:
A Grunt(id:1) spawns at location [A,30].
  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
A _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
B _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
C _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
D _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
E S _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
F _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
G _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
H _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
I _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
J _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

```

Initial regen: 1/3
 Double Regen (pass): 2/6

↳ 2/6

At the end of ^{if any enemy} ^{being} ^{gone}
 1st row: always [1st row, last col]

Acceptance Test at015

Part 4 of 8

```

state:in game(1.0), debug, ok
Starfighter:
[0,S]->health:70/70, energy:70/70, Regen:1/3, Armour:1, Vision:13, Move:10, Move Cost:3, location:[E,1]
Projectile Pattern:Standard, Projectile Damage:70, Projectile Cost:5 (energy)
Power:Recall (50 energy): Teleport back to spawn.
score:0
Enemy:
[1,G]->health:100/100, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,30]
Projectile:
Friendly Projectile Action:
Enemy Projectile Action:
Starfighter Action:
The Starfighter(id:0) passes at location [E,1], doubling regen rate.
Enemy Action:
Natural Enemy Spawn:
A Grunt(id:1) spawns at location [A,30].
  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
A  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
B  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
C  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
D  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
E  S  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
F  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
G  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
H  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
I  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
J  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

```

- projectiles move
- Energy regen done before pass
- Grunt preempted by pass
- Regen then act
- Enemy spawn



```

->pass
state:in game(2.0), debug, ok
Starfighter:
[0,S]->health:70/70, energy:70/70, Regen:1/3, Armour:1, Vision:13, Move:10, Move Cost:3, location:[E,1]
Projectile Pattern:Standard, Projectile Damage:70, Projectile Cost:5 (energy)
Power:Recall (50 energy): Teleport back to spawn.
score:0
Enemy:
[1,G]->health:110/110, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,28]
[2,G]->health:100/100, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,30]
Projectile:
[-1,<]->damage:15, move:4, location:[A,27]
Friendly Projectile Action:
Enemy Projectile Action:
Starfighter Action:
The Starfighter(id:0) passes at location [E,1], doubling regen rate.
Enemy Action:
A Grunt(id:1) gains 10 total health. Phase I
A Grunt(id:1) moves: [A,30] -> [A,28] Phase 2
An enemy projectile(id:-1) spawns at location [A,27].
Natural Enemy Spawn:
A Grunt(id:2) spawns at location [A,30].
  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
A  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
B  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
C  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
D  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
E  S  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
F  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
G  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
H  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
I  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
J  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

```

(no effect if already Regen max) applied in the beginning of Phase 2

→ 3/6

Phase I Phase 2

new G.

Acceptance Test at015

Part 5 of 8

```
state:in game(2.0), debug, ok
Starfighter:
 [0,S]->health:70/70, energy:70/70, Regen:1/3, Armour:1, Vision:13, Move:10, Move Cost:3, location:[E,1]
 Projectile Pattern:Standard, Projectile Damage:70, Projectile Cost:5 (energy)
 Power:Recall (50 energy): Teleport back to spawn.
 score:0
Enemy:
 [1,G]->health:110/110, Regen:1, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,28]
 [2,G]->health:100/100, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,30]
Projectile:
 [-1,<]->damage:15, move:4, location:[A,27]
Friendly Projectile Action:
Enemy Projectile Action:
Starfighter Action:
 The Starfighter(id:0) passes at location [E,1], doubling regen rate.
Enemy Action:
 A Grunt(id:1) gains 10 total health.
 A Grunt(id:1) moves: [A,30] -> [A,28]
 A enemy projectile(id:-1) spawns at location [A,27].
Natural Enemy Spawn:
 A Grunt(id:2) spawns at location [A,30].
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
A -
B -
C -
D -
E S
F -
G -
H -
I -
J -
```

- - projectiles move
- - Energy regen done before pass
- Grunt preempted by pass
- - Regen then act
- - Enemy spawn

```
->pass
state:in game(3.0), debug, ok
Starfighter:
 [0,S]->health:70/70, energy:70/70, Regen:1/3, Armour:1, Vision:13, Move:10, Move Cost:3, location:[E,1]
 Projectile Pattern:Standard, Projectile Damage:70, Projectile Cost:5 (energy)
 Power:Recall (50 energy): Teleport back to spawn.
 score:0
Enemy:
 [1,G]->health:120/120, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,26]
 [2,G]->health:110/110, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,28]
 [3,I]->health:50/50, Regen:0, Armour:0, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[H,30]
Projectile:
 [-1,<]->damage:15, move:4, location:[A,23]
 [-2,<]->damage:15, move:4, location:[A,25]
 [-3,<]->damage:15, move:4, location:[A,27]
Friendly Projectile Action:
Enemy Projectile Action:
 A enemy projectile(id:-1) moves: [A,27] -> [A,23]
Starfighter Action:
 The Starfighter(id:0) passes at location [E,1], doubling regen rate.
Enemy Action:
 A Grunt(id:1) gains 10 total health
 A Grunt(id:2) gains 10 total health
 A Grunt(id:1) moves: [A,28] -> [A,26]
 A enemy projectile(id:-2) spawns at location [A,25]
 A Grunt(id:2) moves: [A,30] -> [A,28]
 A enemy projectile(id:-3) spawns at location [A,27].
Natural Enemy Spawn:
 A Interceptor(id:3) spawns at location [H,30].
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
A -
B -
C -
D -
E S
F -
G -
H -
I -
J -
```

Regen applied in the beginning of Phase 2

Enemy Mov.
1. Travel (□□□□) (Starfy.)
2. teleport □ □

Phase I
Phase 2

2/6

->pass

Enemy:

Projectile:

Friendly Projectile Action:

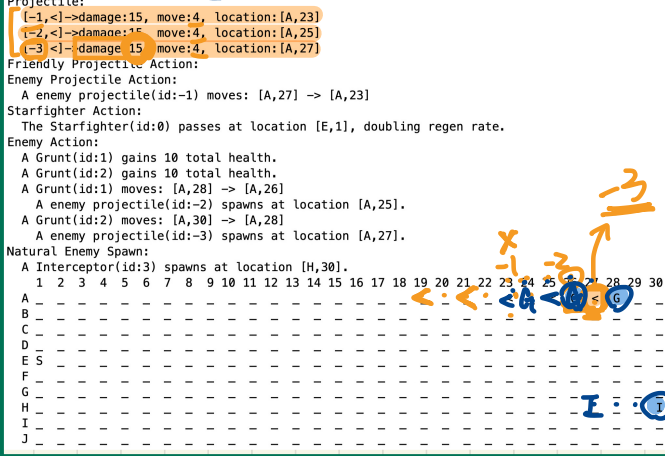
Enemy Action:

Natural Enemy Spawn:

Acceptance Test at015

Part 6 of 8

```
state:in game(3.0), debug, ok
Starfighter:
[0,5]->health:70/70, energy:70/70, Regen:1/3, Armour:1, Vision:13, Move:10, Move Cost:3, location:[E,1]
Projectile Pattern:Standard, Projectile Damage:70, Projectile Cost:5 (energy)
Power:Recall (50 energy): Teleport back to spawn.
score:0
Enemy:
[1,G]->health:120/120, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,26]
[2,G]->health:100/110, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,28]
[3,I]->health:50/50, Regen:0, Armour:0, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[H,30]
Projectile:
[-1,<]->damage:15, move:4, location:[A,23]
[-2,<]->damage:15, move:4, location:[A,25]
[-3,<]->damage:15, move:4, location:[A,27]
Friendly Projectile Action:
Enemy Projectile Action:
A enemy projectile(id:-1) moves: [A,27] -> [A,23]
Starfighter Action:
The Starfighter(id:0) passes at location [E,1], doubling regen rate.
Enemy Action:
A Grunt(id:1) gains 10 total health.
A Grunt(id:2) gains 10 total health.
A Grunt(id:1) moves: [A,28] -> [A,26]
A enemy projectile(id:-2) spawns at location [A,25].
A Grunt(id:2) moves: [A,30] -> [A,28]
A enemy projectile(id:-3) spawns at location [A,27].
Natural Enemy Spawn:
A Interceptor(id:3) spawns at location [H,30].
```



Pass

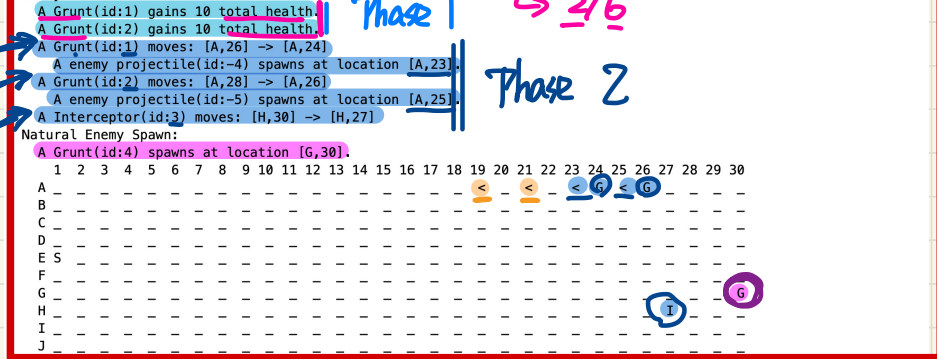
Grunt

Interceptor

P1
P2

P2

```
->PASS
state:in game(4.0), debug, ok
Starfighter:
[0,5]->health:70/70, energy:70/70, Regen:1/3, Armour:1, Vision:13, Move:10, Move Cost:3, location:[E,1]
Projectile Pattern:Standard, Projectile Damage:70, Projectile Cost:5 (energy)
Power:Recall (50 energy): Teleport back to spawn.
score:0
Enemy:
[1,G]->health:130/130, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,24]
[2,G]->health:120/120, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,26]
[3,I]->health:50/50, Regen:0, Armour:0, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[H,27]
[4,G]->health:100/100, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[G,30]
Projectile:
[-1,<]->damage:15, move:4, location:[A,19]
[-2,<]->damage:15, move:4, location:[A,21]
[-4,<]->damage:15, move:4, location:[A,23]
[-5,<]->damage:15, move:4, location:[A,25]
Friendly Projectile Action:
Enemy Projectile Action:
A enemy projectile(id:-1) moves: [A,23] -> [A,19]
A enemy projectile(id:-2) moves: [A,25] -> [A,21]
A enemy projectile(id:-3) moves: [A,27] -> [A,26]
The projectile collides with Grunt(id:1) at location [A,26], healing 15 damage.
Starfighter Action:
The Starfighter(id:0) passes at location [E,1], doubling regen rate.
Enemy Action:
A Grunt(id:1) gains 10 total health.
A Grunt(id:2) gains 10 total health.
A Grunt(id:1) moves: [A,26] -> [A,24]
A enemy projectile(id:-4) spawns at location [A,23].
A Grunt(id:2) moves: [A,28] -> [A,26]
A enemy projectile(id:-5) spawns at location [A,25].
A Interceptor(id:3) moves: [H,30] -> [H,27]
Natural Enemy Spawn:
A Grunt(id:4) spawns at location [G,30].
```



- projectiles move
- Energy regen done before pass
- Grunt preempted by pass
- Interceptor not preempted by pass
- Regen then act
- Enemy spawn

Regen

Phase 1

Phase 2

→ 2/6

Acceptance Test at015

Part 7 of 8

```

state:in game(4,0), debug, ok
Starfighter:
[0,5]->health:70/70, energy:70/70, Regen:1/3, Armour:1, Vision:13, Move:10, Move Cost:3, location:[E,1]
Projectile Pattern:Standard, Projectile Damage:70, Projectile Cost:5 (energy)
Power:Recall (50 energy): Teleport back to spawn.
score:0
Enemy:
[1,G]->health:130/130, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,24]
[2,G]->health:120/120, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,26]
[3,I]->health:50/50, Regen:0, Armour:0, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[H,27]
[4,G]->health:100/100, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[G,30]
Projectile:
[-1,<-]->damage:15, mov:4, location:[A,19]
[-2,<-]->damage:15, mov:4, location:[A,21]
[-4,<-]->damage:15, mov:4, location:[A,23]
[-5,-]->damage:15, move:4, location:[A,25]
Friendly Projectile Action:
Enemy Projectile Action:
A enemy projectile(id:-1) moves: [A,23] -> [A,19]
A enemy projectile(id:-2) moves: [A,25] -> [A,21]
A enemy projectile(id:-3) moves: [A,27] -> [A,26]
The projectile collides with Grunt(id:1) at location [A,26], healing 15 damage.
Starfighter Action:
The Starfighter(id:0) passes at location [E,1], doubling regen rate.
Enemy Action:
A Grunt(id:1) gains 10 total health.
A Grunt(id:2) gains 10 total health.
A Grunt(id:1) moves: [A,26] -> [A,24]
A enemy projectile(id:-4) spawns at location [A,23].
A Grunt(id:2) moves: [A,28] -> [A,26]
A enemy projectile(id:-5) spawns at location [A,25].
A Interceptor(id:3) moves: [H,30] -> [H,27]
Natural Enemy Spawn:
A Grunt(id:4) spawns at location [G,30].

```

- projectiles move
- Energy regen done before pass
- Grunt preempted by pass
- Interceptor not preempted by pass
- Regen then act
- Enemy spawn

Regen

```

state:in game(5,0), debug, ok
Starfighter:
[0,5]->health:70/70, energy:70/70, Regen:1/3, Armour:1, Vision:13, Move:10, Move Cost:3, location:[E,1]
Projectile Pattern:Standard, Projectile Damage:70, Projectile Cost:5 (energy)
Power:Recall (50 energy): Teleport back to spawn.
score:0
Enemy:
[1,G]->health:140/140, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,22]
[2,G]->health:130/130, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,24]
[3,I]->health:50/50, Regen:0, Armour:0, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[H,24]
[4,G]->health:110/110, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[G,28]
[5,I]->health:50/50, Regen:0, Armour:0, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[D,30]
Projectile:
[-1,<-]->damage:15, move:4, location:[A,15]
[-2,<-]->damage:15, move:4, location:[A,17]
[-4,<-]->damage:15, move:4, location:[A,19]
[-6,<-]->damage:15, move:4, location:[A,21]
[-7,<-]->damage:15, move:4, location:[A,23]
[-8,<-]->damage:15, move:4, location:[G,27]
Friendly Projectile Action:
Enemy Projectile Action:
A enemy projectile(id:-1) moves: [A,19] -> [A,15]
A enemy projectile(id:-2) moves: [A,21] -> [A,17]
A enemy projectile(id:-4) moves: [A,23] -> [A,19]
A enemy projectile(id:-5) moves: [A,25] -> [A,24]
The projectile collides with Grunt(id:1) at location [A,24], healing 15 damage.
Starfighter Action:
The Starfighter(id:0) passes at location [E,1], doubling regen rate.
Enemy Action:
A Grunt(id:1) gains 10 total health.
A Grunt(id:2) gains 10 total health.
A Grunt(id:4) gains 10 total health.
A Grunt(id:1) moves: [A,24] -> [A,22]
A enemy projectile(id:-6) spawns at location [A,21].
A Grunt(id:2) moves: [A,26] -> [A,24]
A enemy projectile(id:-7) spawns at location [A,23].
A Interceptor(id:3) moves: [H,27] -> [H,24]
A Grunt(id:4) moves: [G,30] -> [G,28]
A enemy projectile(id:-8) spawns at location [G,27].
Natural Enemy Spawn:
A Interceptor(id:5) spawns at location [D,30].

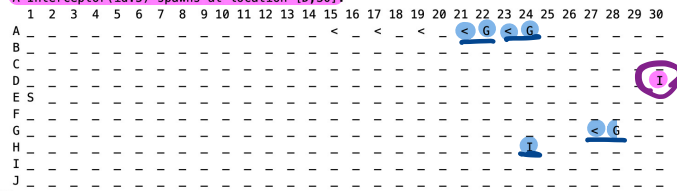
```

Grunt (id:1) already max health
↳ no effect

Phase 1

Phase 2

These 3 ≥ 6



Acceptance Test at015

Part 8 of 8

```

state:in game(5.0), debug, ok
Starfighter:
[0,5]->health:70/70, energy 70/70, Regen:1/3, Armour:1, Vision:13, Move:10, Move Cost:3, location:[E,1]
Projectile Pattern:Standard, Projectile Damage:70, Projectile Cost:5 (energy)
Power:Recall (50 energy): Teleport back to spawn.
score:0

Enemy:
[1,G]->health:140/140, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,22]
[2,G]->health:130/130, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,24]
[3,I]->health:50/50, Regen:0, Armour:0, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[H,24]
[4,G]->health:110/110, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[G,28]
[5,I]->health:50/50, Regen:0, Armour:0, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[D,30]

Projectile:
[-1,<->->damage:15, move:4, location:[A,15]
[-2,<->->damage:15, move:4, location:[A,17]
[-4,<->->damage:15, move:4, location:[A,19]
[-6,<->->damage:15, move:4, location:[A,21]
[-7,<->->damage:15, move:4, location:[A,23]
[-8,<->->damage:15, move:4, location:[G,27]

Friendly Projectile Action:
Enemy Projectile Action:
A enemy projectile(id:-1) moves: [A,19] -> [A,15]
A enemy projectile(id:-2) moves: [A,21] -> [A,17]
A enemy projectile(id:-4) moves: [A,23] -> [A,19]
A enemy projectile(id:-5) moves: [A,25] -> [A,24]
The projectile collides with Grunt(id:1) at location [A,24], healing 15 damage.

Starfighter Action:
The Starfighter(id:0) passes at location [E,1], doubling regen rate.

Enemy Action:
A Grunt(id:1) gains 10 total health.
A Grunt(id:2) gains 10 total health.
A Grunt(id:4) gains 10 total health.
A Grunt(id:1) moves: [A,24] -> [A,22]
A enemy projectile(id:-6) spawns at location [A,21].
A Grunt(id:2) moves: [A,26] -> [A,24]
A enemy projectile(id:-7) spawns at location [A,23].
A Interceptor(id:3) moves: [H,27] -> [H,24]
A Grunt(id:4) moves: [G,30] -> [G,28]
A enemy projectile(id:-8) spawns at location [G,27].

Natural Enemy Spawn:
A Interceptor(id:5) spawns at location [D,30].
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
A
B
C
D
E 5
F
G
H
I
J
    
```

Projectiles move
Energy regen done before fire
Grunt not preempted by fire
Interceptor preempted by fire
Regen then act
Enemy spawn

Regen

```

:fire
state:in game(6.0), debug, ok
Starfighter:
[0,5]->health:70/70, energy 65/70, Regen:1/3, Armour:1, Vision:13, Move:10, Move Cost:3, location:[E,1]
Projectile Pattern:Standard, Projectile Damage:70, Projectile Cost:5 (energy)
Power:Recall (50 energy): Teleport back to spawn.
score:0

Enemy:
[1,G]->health:140/140, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,22]
[2,G]->health:130/130, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[A,22]
[3,I]->health:50/50, Regen:0, Armour:0, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[E,24]
[4,G]->health:110/110, Regen:1, Armour:1, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[G,26]
[5,I]->health:50/50, Regen:0, Armour:0, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[F,30]
[6,I]->health:50/50, Regen:0, Armour:0, Vision:5, seen_by_Starfighter:F, can_see_Starfighter:F, location:[F,30]

Projectile:
[-1,<->->damage:15, move:4, location:[A,11]
[-2,<->->damage:15, move:4, location:[A,13]
[-4,<->->damage:15, move:4, location:[A,15]
[-6,<->->damage:15, move:4, location:[A,17]
[-8,<->->damage:15, move:4, location:[G,23]
[-9,*->->damage:70, move:5, location:[E,2]
[-10,<->->damage:15, move:4, location:[A,19]
[-11,<->->damage:15, move:4, location:[A,21]
[-12,<->->damage:15, move:4, location:[G,25]

Friendly Projectile Action:
Enemy Projectile Action:
A enemy projectile(id:-1) moves: [A,15] -> [A,11]
A enemy projectile(id:-2) moves: [A,17] -> [A,13]
A enemy projectile(id:-4) moves: [A,19] -> [A,15]
A enemy projectile(id:-6) moves: [A,21] -> [A,17]
A enemy projectile(id:-7) moves: [A,23] -> [A,22]
The projectile collides with Grunt(id:1) at location [A,22], healing 15 damage.
A enemy projectile(id:-8) moves: [G,27] -> [G,23]

Starfighter Action:
The Starfighter(id:0) fires at location [E,1].
A friendly projectile(id:-9) spawns at location [E,2].

Enemy Action:
A Interceptor(id:3) moves: [H,24] -> [E,24]
A Interceptor(id:5) moves: [D,30] -> [F,30]
A Grunt(id:1) moves: [A,22] -> [A,20]
A enemy projectile(id:-10) spawns at location [A,19].
A Grunt(id:2) moves: [A,24] -> [A,22]
A enemy projectile(id:-11) spawns at location [A,21].
A Grunt(id:4) moves: [G,28] -> [G,26]
A enemy projectile(id:-12) spawns at location [G,25].

Natural Enemy Spawn:
A Interceptor(id:6) spawns at location [F,30].
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
A
B
C
D
E 5
F
G
H
I
J
    
```

Energy fire Grunt Inter.
Grunt (id:1) already max health
no effect
Regen (no effect: max energy)
- firing: 70-5 = 65

Phase 1
Phase 2