

# I-Frames and Stun Lock

Knox Game Design

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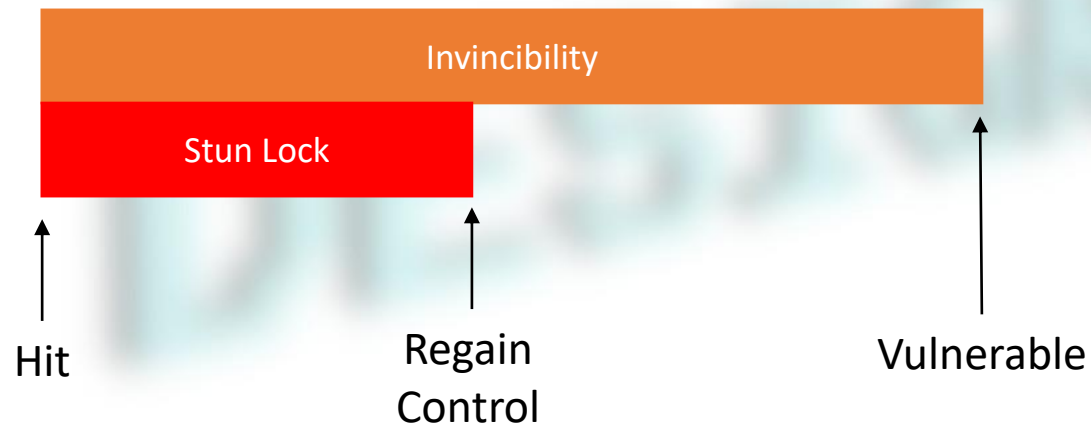
Levi D. Smith

# What are I-Frames

- Invincibility frames
- Gives player a chance to escape when damaged
- Prevents losing health on every collision update
- Visual cues
  - Blinking
  - Transparency
  - Damage sprite / animation
- Knockback
  - player's position is moved backwards from the collision point
  - Avoid knocking player into wall / off platforms

# What is Stun Lock?






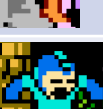
- Not allowing player to move during damage time
- Not having stun lock will make the control feel "ghosty"
- Making stun lock too long will make the game feel "cheap"
- Stun lock is typically a fraction of the Invincibility time



# Considerations

- I-Frames length too long
  - May allow players skip parts of a level
- Damage boosting
  - getting hit on purpose to move faster or skip past obstacles/enemies
- I-Frames length too short
  - may result in player getting hit by the same enemy/projectile multiple times
  - Inescapable enemies

# Examples

	Game	I-Frames	Seconds	Stun Frames	Seconds
	Ninja Gaiden	60	1.0	32	0.53
	Legend of Zelda	48	0.8	8	0.13
	Super Mario Bros	214	3.56	55	0.92
	Metroid	48	0.8	8	0.13
	Castlevania	128	2.13	51	0.85
	Mega Man 2	135	2.25	35	0.58

BOX  
ME  
DESIGN

# Statistics

	I-Frames	Seconds	Stun Frames	Seconds
Min	48	0.8	8	0.13
Max	214	3.56	55	0.92
Average	114.6	1.908	31.4	0.522
Standard Deviation	62.20	1.03	20.24	0.34

# Some things to try

- Longer stun lock for more damage taken (boss damage)
- Longer I-Frames for easier difficulty levels

