

Media and Gaming Accessibility

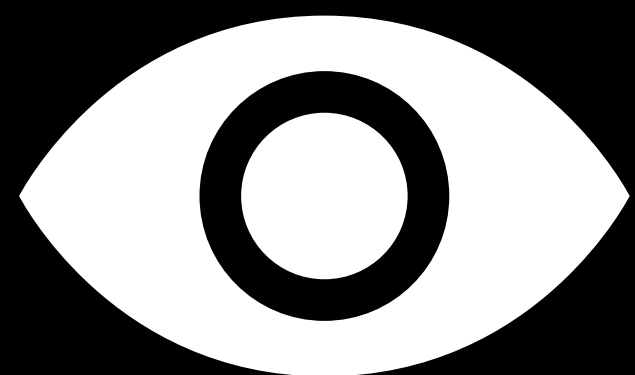
Session 217

Greg Hughes, Software Engineering Manager
Charlotte Hill, Software Engineer



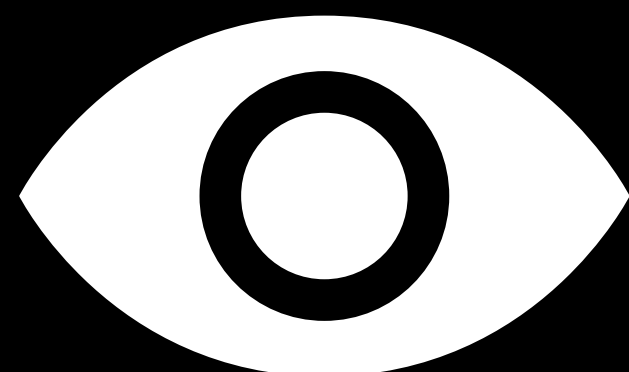
Surprise and Delight

Disability Categories



Vision

Disability Categories

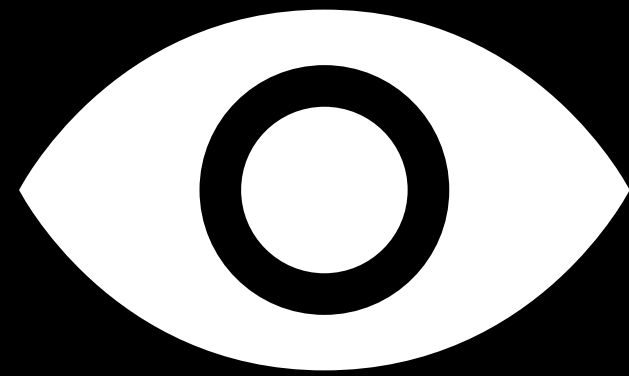


Vision



Motor

Disability Categories



Vision

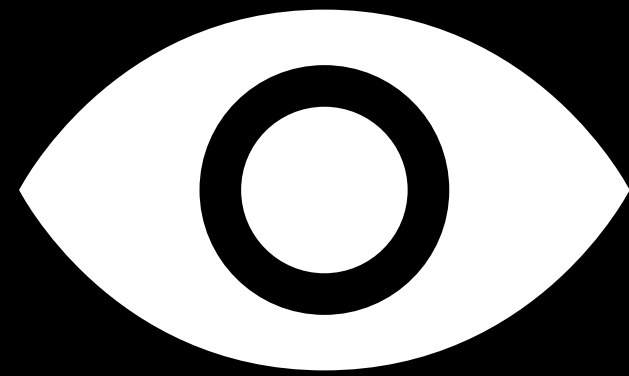


Motor



Hearing

Disability Categories



Vision



Motor



Hearing



Cognition

Accessibility of Media and Video

Accessibility of Media and Video

Accessibility of Games

Accessibility of Media and Video

Accessibility of Games

Demo Game

Accessibility of Media and Video

Accessibility of Media and Video

Images



Accessibility of Media and Video



Accessibility of Media and Video

“Woman sitting in hammock playing guitar”



Accessibility of Media and Video

“Woman sitting in hammock playing guitar”

“Person playing guitar with custom artwork drawn using a marker”



Accessibility of Media and Video

“Woman sitting in hammock playing guitar”

“Person playing guitar with custom artwork drawn using a marker”

“Image demonstrating the use of a camera’s aperture to make the foreground blurry while keeping the subject in focus”



Accessibility of Media and Video

Images: add relevant and concise alternative text

Accessibility of Media and Video

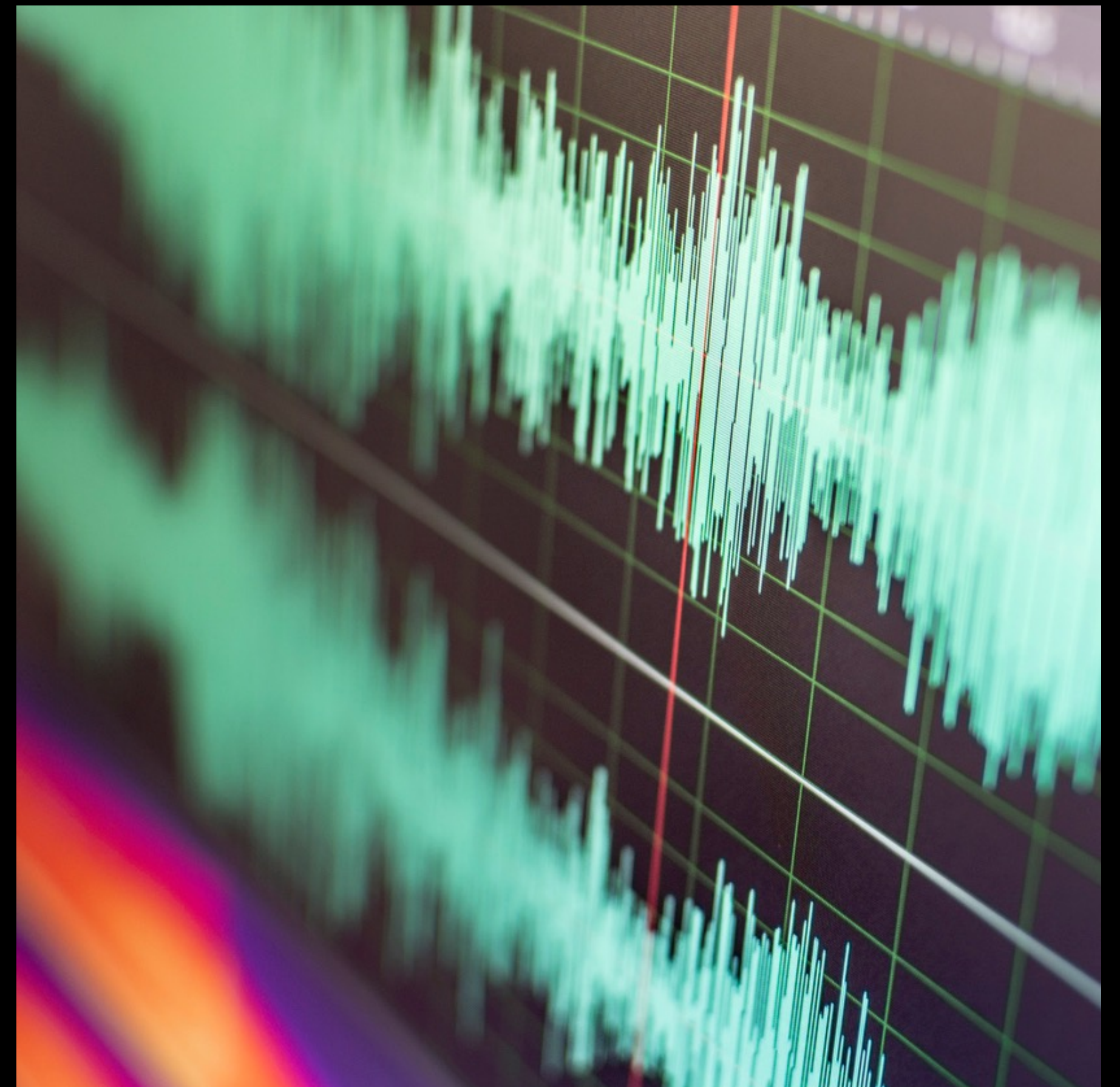
Images: add relevant and concise alternative text

Audio

Accessibility of Media and Video

Images: add relevant and concise alternative text

Audio



Accessibility of Media and Video



Accessibility of Media and Video

Provide a transcript if applicable



Accessibility of Media and Video

Provide a transcript if applicable

Provide visual or tactile feedback if applicable



Accessibility of Media and Video

Images: add relevant and concise alternative text

Audio: provide alternative access to information

Accessibility of Media and Video

Images: add relevant and concise alternative text

Audio: provide alternative access to information

Video

Accessibility of Media and Video

Accessibility of Media and Video

Visual



Accessibility of Media and Video

Visual



Audible



Accessibility of Media and Video

Visual



Audible



Legible

Closed Captions



**VoiceOver: Picture three is
garlic powder.**

```
guard let mediaSelectionGroup = asset.mediaSelectionGroup(forMediaCharacteristic: .legible) else
{
    return nil // No media selection group. Don't return a menu
}
```

```
let options = AVMediaSelectionGroup.mediaSelectionOptions(from: mediaSelectionGroup.options,
withoutMediaCharacteristics: [ AVMediaCharacteristic.containsOnlyForcedSubtitles.rawValue,
AVMediaCharacteristic.isAuxiliaryContent.rawValue ])
```

```
if options.isEmpty {
    return nil // No options
}
```

```
let menuItems = options.map { option in
    MenuItem(title: option.displayName, action:
#selector(ViewController.respondToMediaOptionSelection(from:)), keyEquivalent: "")
}
```

```
menuItems.forEach { menuItem in
    menu.addItem(menuItem)
}
```

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}
```



```
@available(OSX 10.9, *)
```

```
public func MACaptionAppearanceCopyBackgroundColor(_ domain: MACaptionAppearanceDomain, _  
behavior: UnsafeMutablePointer<MACaptionAppearanceBehavior>?) -> Unmanaged<CGColor>
```

```
@available(OSX 10.9, *)
```

```
public func MACaptionAppearanceCopyWindowColor(_ domain: MACaptionAppearanceDomain, _ behavior:  
UnsafeMutablePointer<MACaptionAppearanceBehavior>?) -> Unmanaged<CGColor>
```

Accessibility of Media and Video

Visual



Audible



Legible

Closed Captions

Accessibility of Media and Video

Visual



Audible

English

Audio Description

Legible

Closed Captions



```
guard let mediaSelectionGroup = asset.mediaSelectionGroup(forMediaCharacteristic: .audible)
else {
    // No media selection group. Don't return a menu
    return nil
}
```

```
let options = AVMediaSelectionGroup.mediaSelectionOptions(from: mediaSelectionGroup.options,
withMediaCharacteristics: [ AVMediaCharacteristic.isMainProgramContent.rawValue ])
if options.isEmpty {
    return nil // No options
}
```

```
let menuItems = options.map { option in
    MenuItem(title: option.displayName, action:
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```

Accessibility of Media and Video

Visual



Audible

English

Audio Description

Legible

Closed Captions

Accessibility of Media and Video

Images: add relevant and concise alternative text

Audio: provide alternative access to information

Video: provide audio descriptions and closed captions

Accessible Games

Charlotte Hill, Software Engineer

Games



NEW GAME

Injustice 2

When iconic superheroes collide



New Games We Love

[See All](#)



Zombie Gunship Survival

Tour the apocalypse

GET

In-App Purchases



Vignettes

\$2.99



Today



Games



Apps



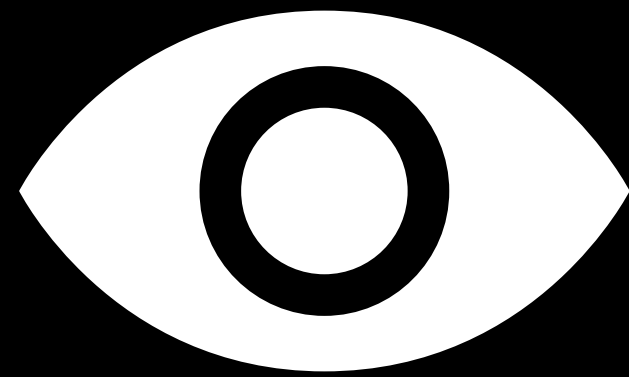
Updates



Search







Vision



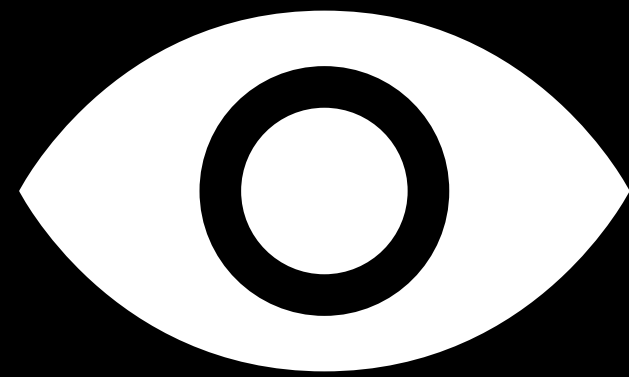
Motor



Hearing



Cognition



Vision

Color

Motion

Dynamic Type

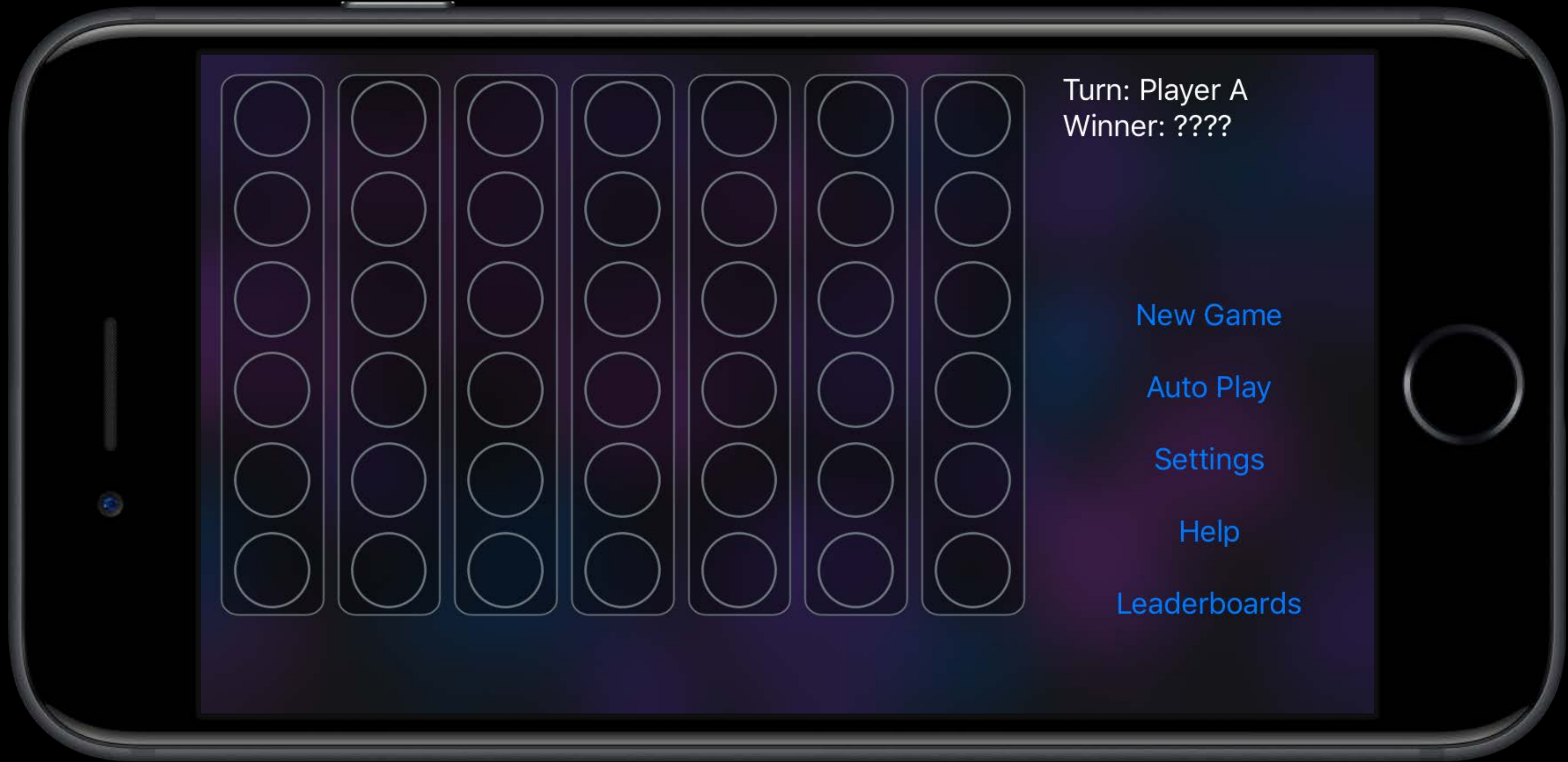
VoiceOver











Turn: Player A
Winner: ????

New Game

Auto Play

Settings

Help

Leaderboards

```
import UIKit

class ViewController: UIViewController {

    let animationView = UIView(frame: .zero)

    override func viewDidLoad() {
        super.viewDidLoad()
        // Do any additional setup after loading the view, typically from a nib.

        animationView.isHidden = UIAccessibilityIsReduceMotionEnabled();
    }
}
```

WebKit: Responsive Design For Motion

<https://webkit.org/blog/7551/responsive-design-for-motion/>



9:41 AM

100%

[Accessibility](#) Larger Text

Larger Accessibility Sizes

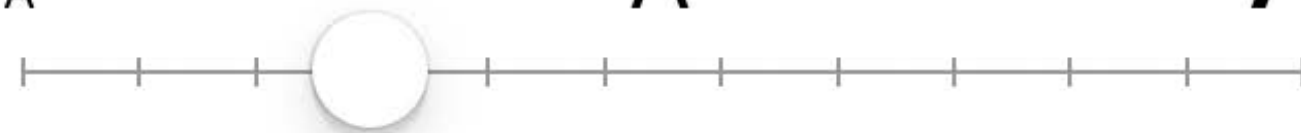


Apps that support Dynamic Type will adjust to your preferred reading size below.

A

A

A





9:41 AM

100%

[Accessibility](#) Larger Text

Larger Accessibility Sizes



Apps that support Dynamic Type will adjust to your preferred reading size below.

A

A

A





9:41 AM

100%

[Accessibility](#) Larger Text

Larger Accessibility Sizes



Apps that
support
Dynamic Type
will adjust to

A

A

A



Related Sessions

[Building Apps with Dynamic Type](#)

Executive Ballroom

Friday 1:50PM

[Accessibility and Dynamic Type Lab](#)

Technology Lab C

Fri 2:30PM-4:00PM

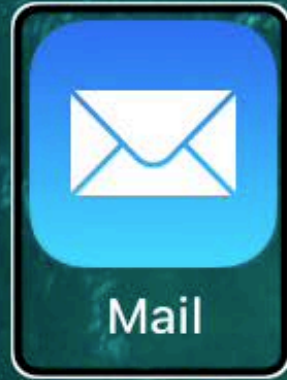


VoiceOver



9:41 AM

100%



Mail



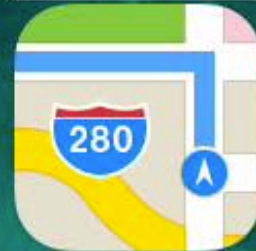
Calendar



Photos



Camera



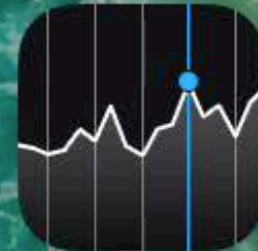
Maps



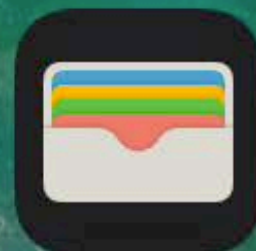
Clock



Weather



Stocks



Wallet



Notes



Reminders



News



iTunes Store



App Store



iBooks



TV



Home



Health



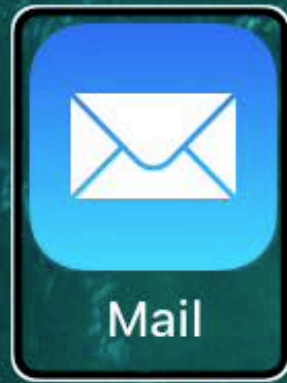
Settings





9:41 AM

100%



Mail



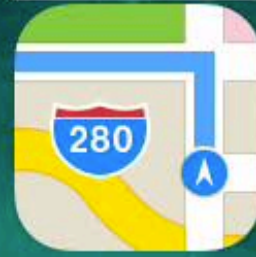
Calendar



Photos



Camera



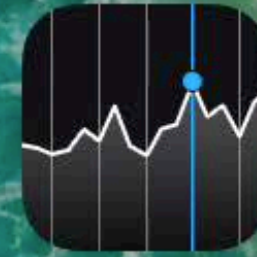
Maps



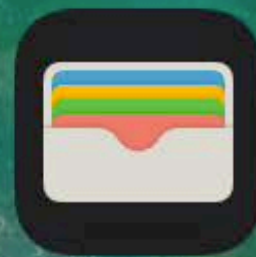
Clock



Weather



Stocks



Wallet



Notes



Reminders



News



iTunes Store



App Store



iBooks



TV



Home



Health



Settings



UIAccessibility

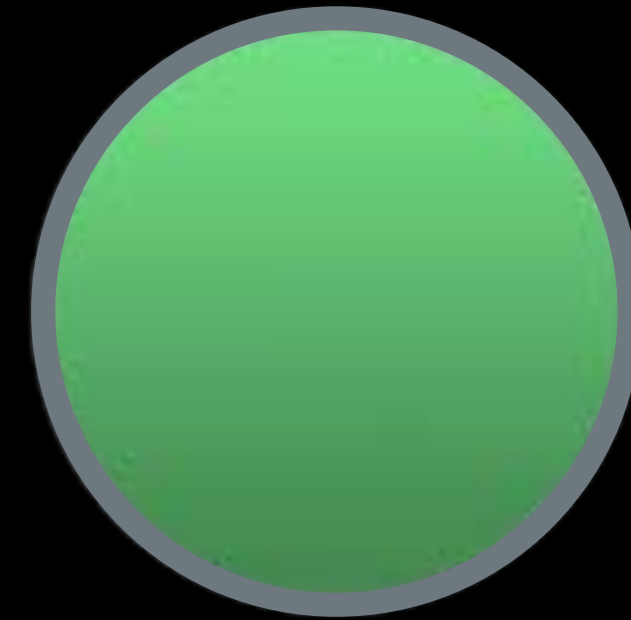
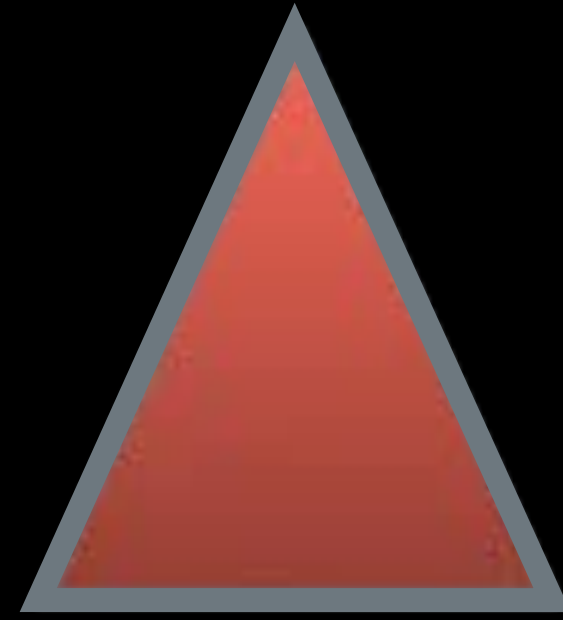
UIAccessibility is implemented on all standard UIKit views and controls so that assistive applications can present them to users with disabilities.

Custom items in a user interface should override aspects of UIAccessibility to supply details where the default value is incomplete.

For example, a UIImageView subclass may need to override accessibilityLabel, but it does not need to override accessibilityFrame.

A completely custom subclass of UIView might need to override all of the UIAccessibility methods except accessibilityFrame.

*/



```
import UIKit

class TokenView: UIView {

    var playerType = "A"

    override var accessibilityLabel: String? {
        get {
            return String.localizedStringWithFormat(NSLocalizedString("Player %@", comment:
"Player name"), playerType)
        }
        set {
            // ignore changes to this value
        }
    }
}
```




Vision

Vision



Use more than one type of indicator, like shapes and colors

Vision



Use more than one type of indicator, like shapes and colors



Provide alternative experiences for reduce motion and dynamic type

Vision



Use more than one type of indicator, like shapes and colors



Provide alternative experiences for reduce motion and dynamic type



Make all your elements accessible and labeled for VoiceOver



Motor

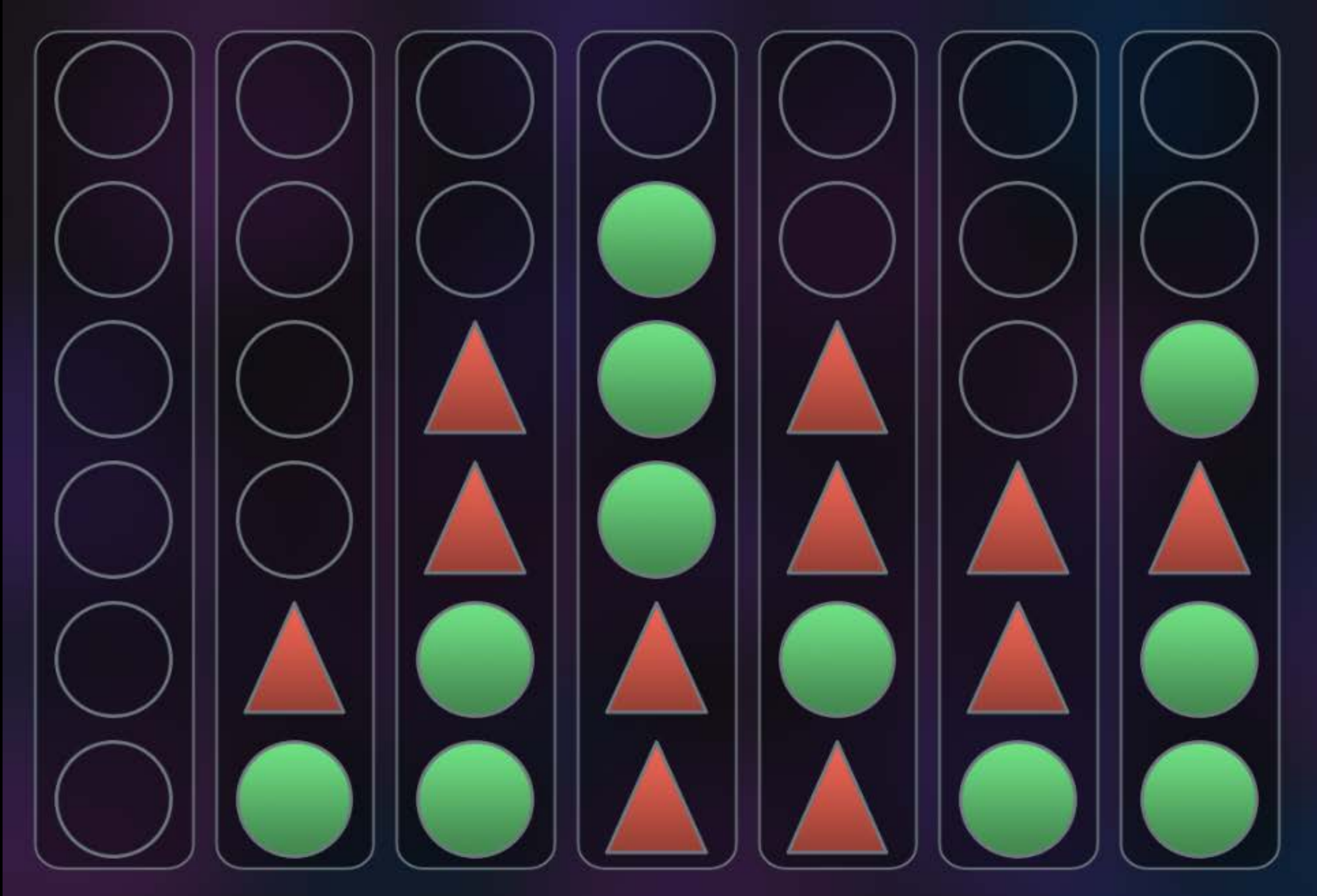
Touch Accommodations

Accessibility Keyboard

Alternative Inputs

Switch Control





Accessibility

Hardware Accessibility Keyboard

The Accessibility Keyboard lets you type and interact with macOS without using a hardware keyboard. It can also be customized using the Panel Editor to add your own controls.

Enable Accessibility Keyboard Panel Editor...

Hide panel after inactivity

Play key sounds

Keys should be entered

Hot Corners...

Show Accessibility status in menu bar

Keyboard

No Suggestions

esc [Brightness] [Volume] [Mission Control] [App Store] [F6] [Media Keys] [Function Keys]

~ ! @ # \$ % ^ & * () _ + = [Enter]

→ | Q W E R T Y U I O P { } | \

⇧ A S D F G H J K L ; ' " , . /

⇧ Z X C V B N M < > ? [] \ /

fn ^ ⌘ ⌘ ⌘ [Touchpad] [Touchpad] [Touchpad]



Related Sessions

[What's New in Accessibility](#)

Grand Ballroom A

Wednesday 1:50PM





Switch Control



9:41 AM

100%



ROUND 1



Tap a sushi to play it, or hold and drag.



9:41 AM

100%



ROUND 1



Tap a sushi to play it, or hold and drag.



Turn: Player A
Winner: Player B
Time: 5

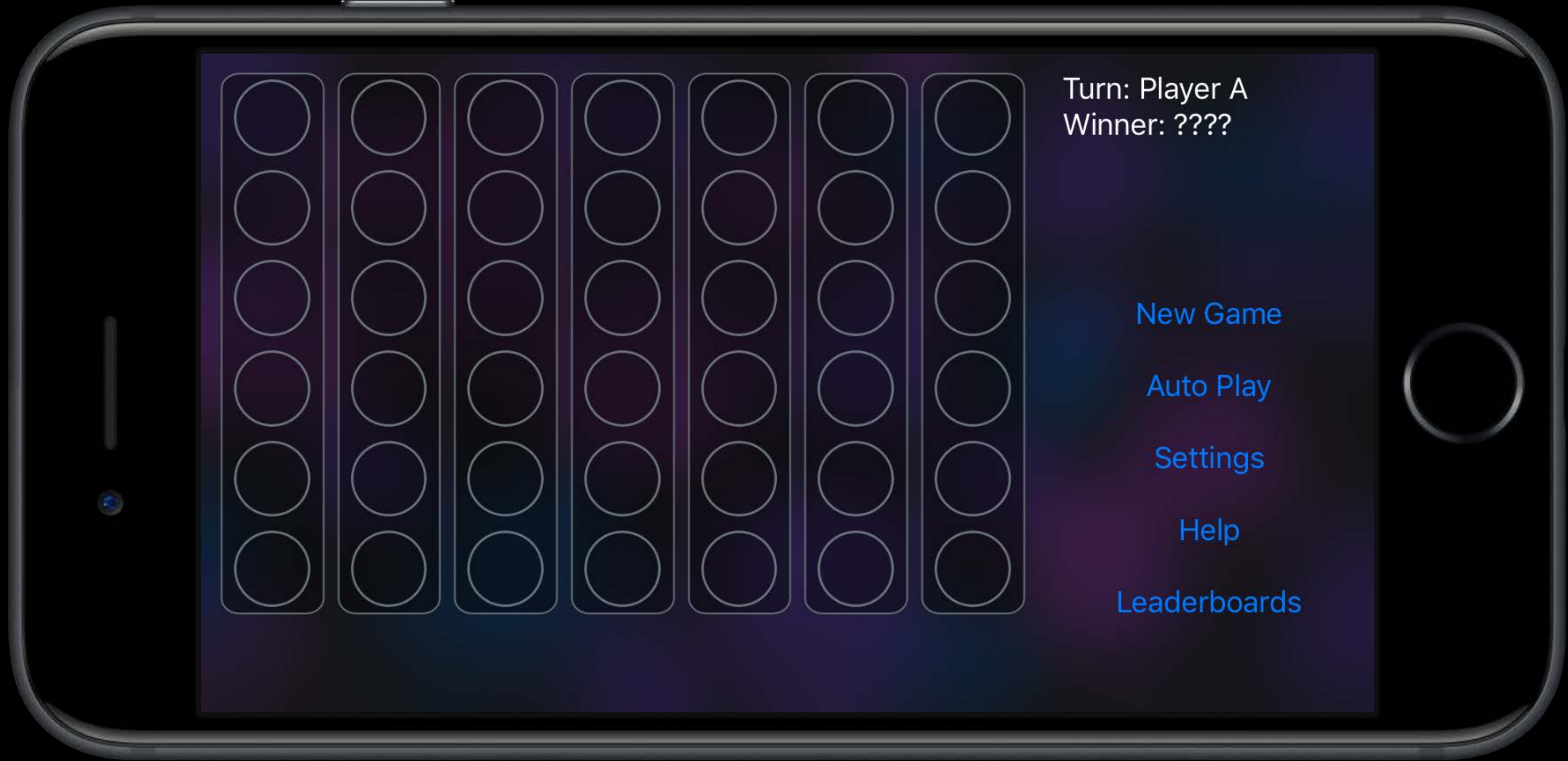
New Game

Auto Play

Settings

Help

Leaderboards



Turn: Player A
Winner: ????

New Game

Auto Play

Settings

Help

Leaderboards

Motor

Motor



Targets should be easy to hit

Motor



Targets should be easy to hit



Provide for different types of inputs like HID controllers and Switch Control

Motor



Targets should be easy to hit



Provide for different types of inputs like HID controllers and Switch Control



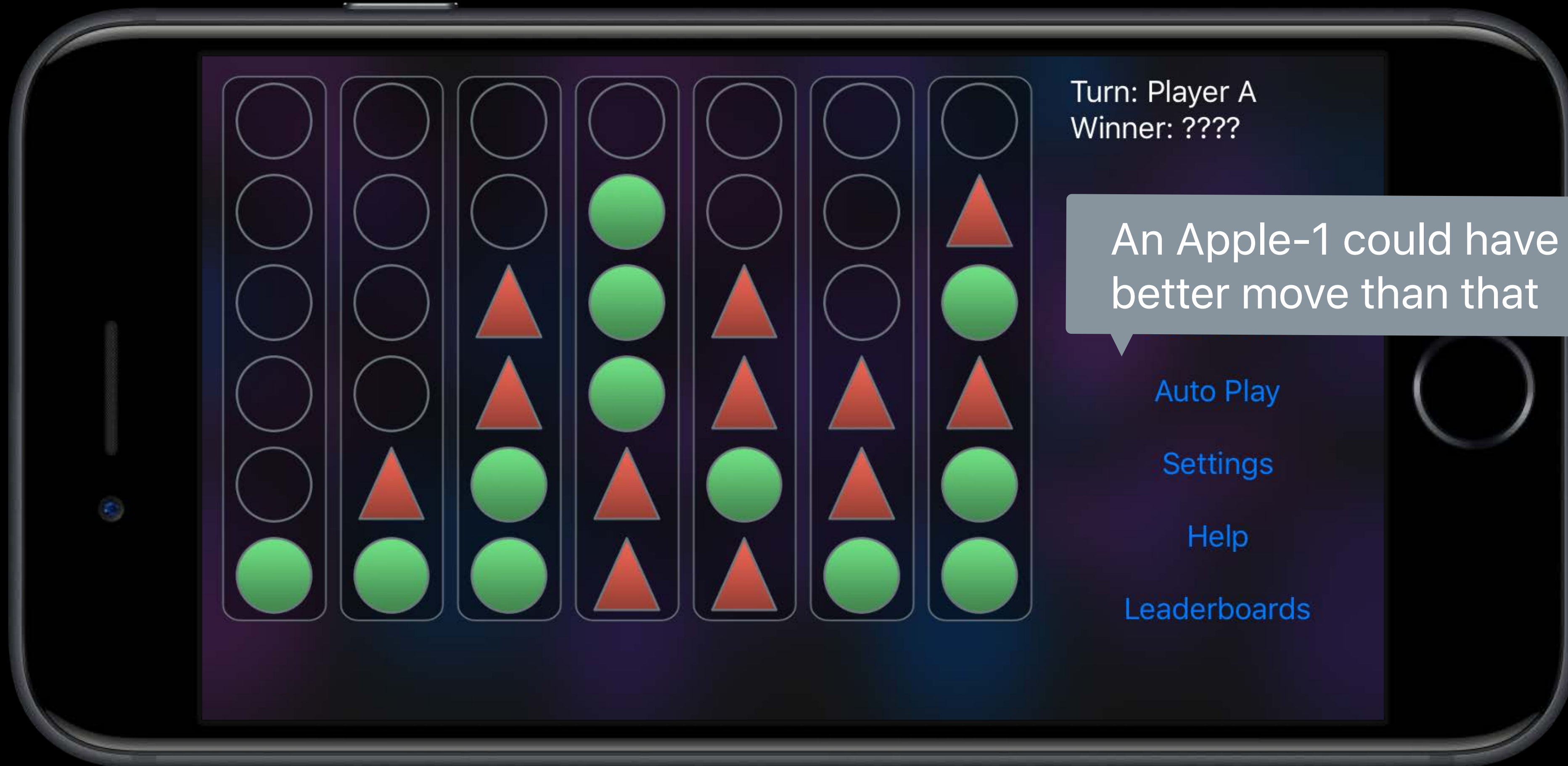
Provide options for custom gestures



Hearing

Captions

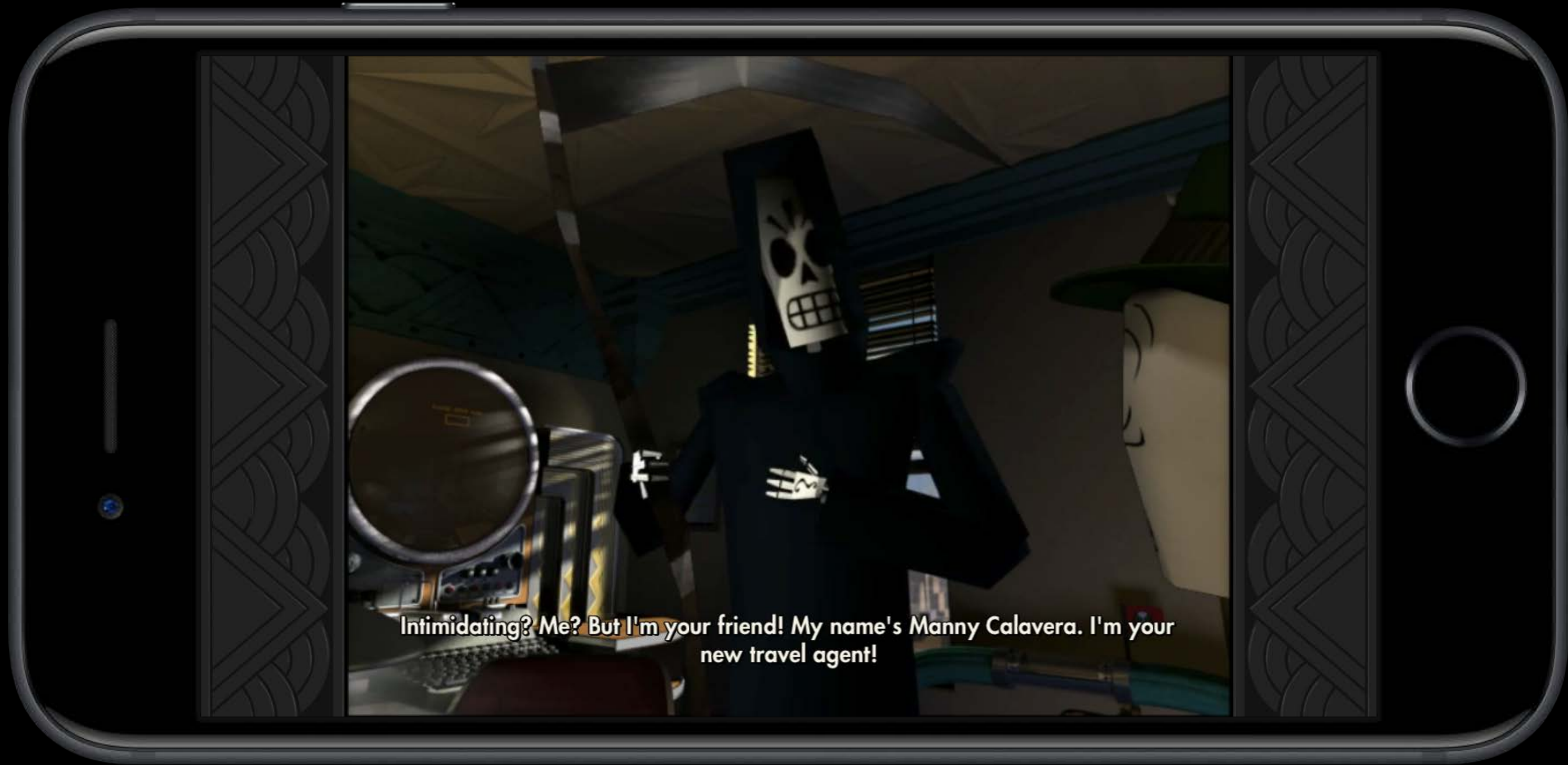
Alert options



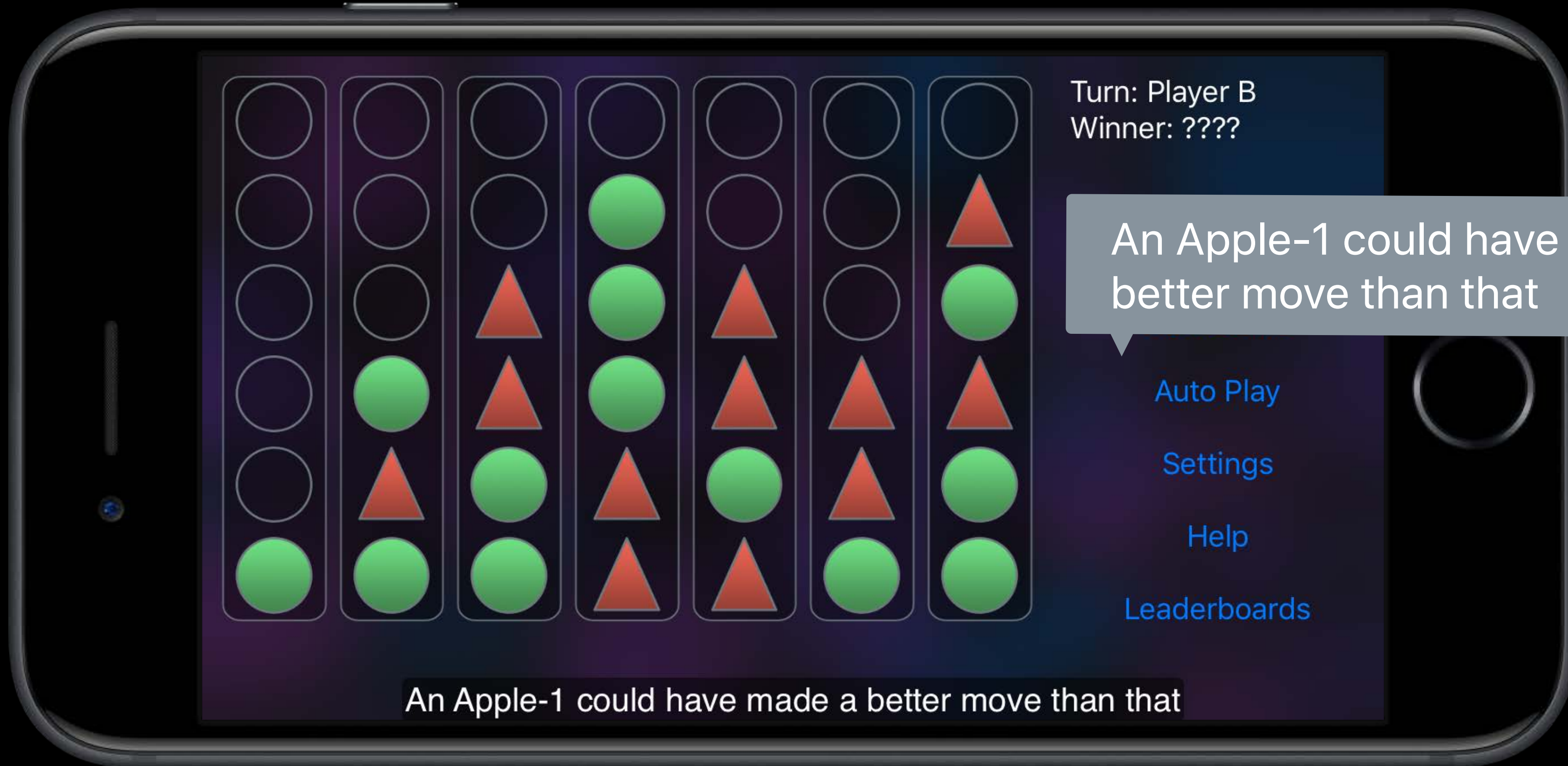
Turn: Player A
Winner: ????

An Apple-1 could have made a better move than that

- Auto Play
- Settings
- Help
- Leaderboards



Intimidating? Me? But I'm your friend! My name's Manny Calavera. I'm your new travel agent!



Turn: Player B
Winner: ????

An Apple-1 could have made a better move than that

Auto Play

Settings

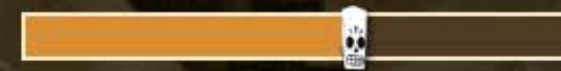
Help

Leaderboards

An Apple-1 could have made a better move than that

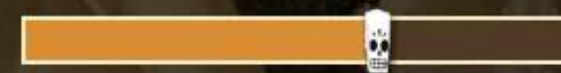
OPTIONS

Brightness



Brighter

Music Volume



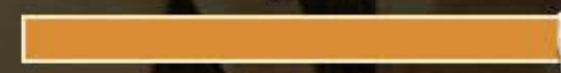
Medium

Sound Effects Volume



Medium

Voice and Movie Volume



High

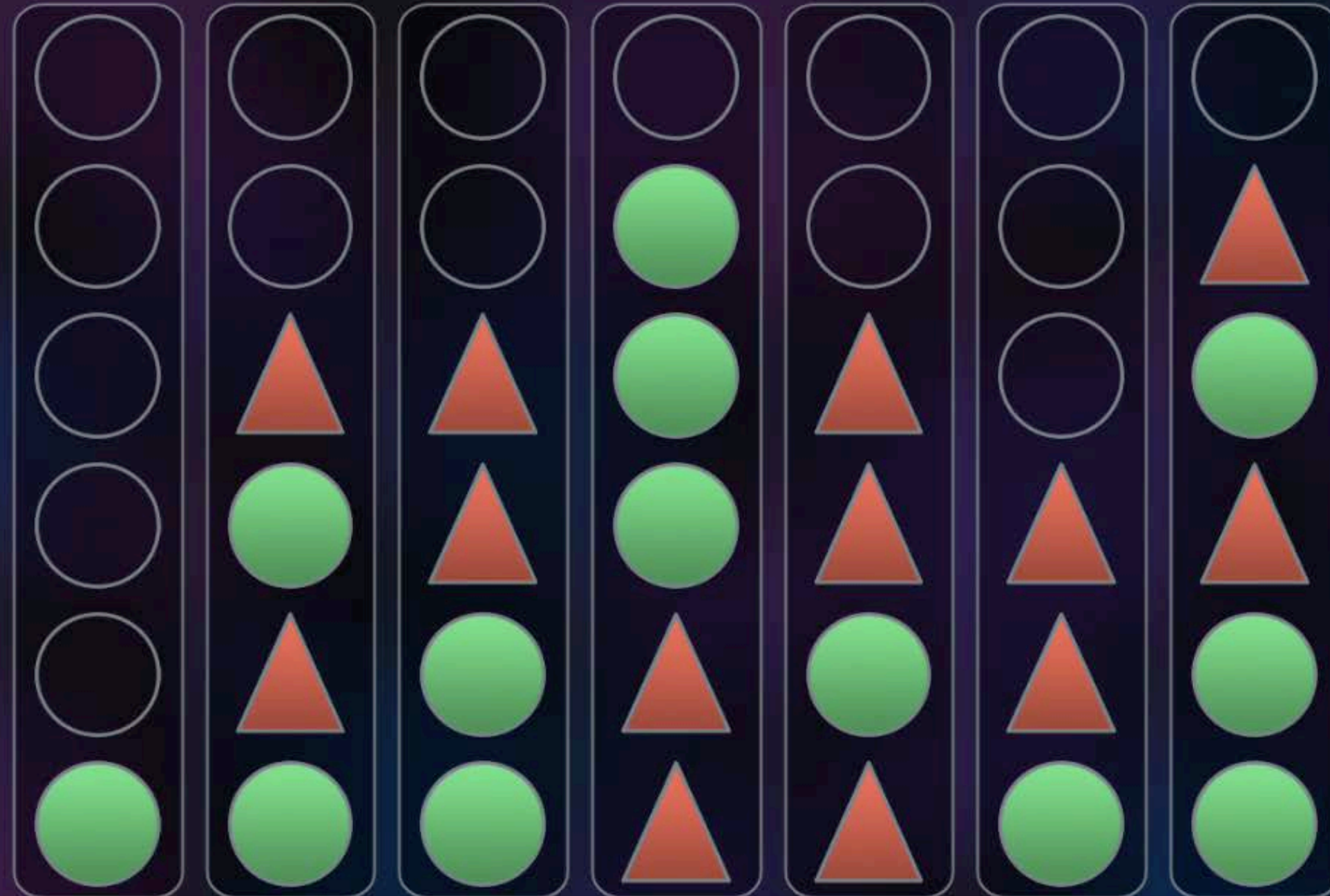
Language

English

Text Mode

Voice and Text

< Return to Main Menu



Turn: Player B
Winner: Player B
Time:

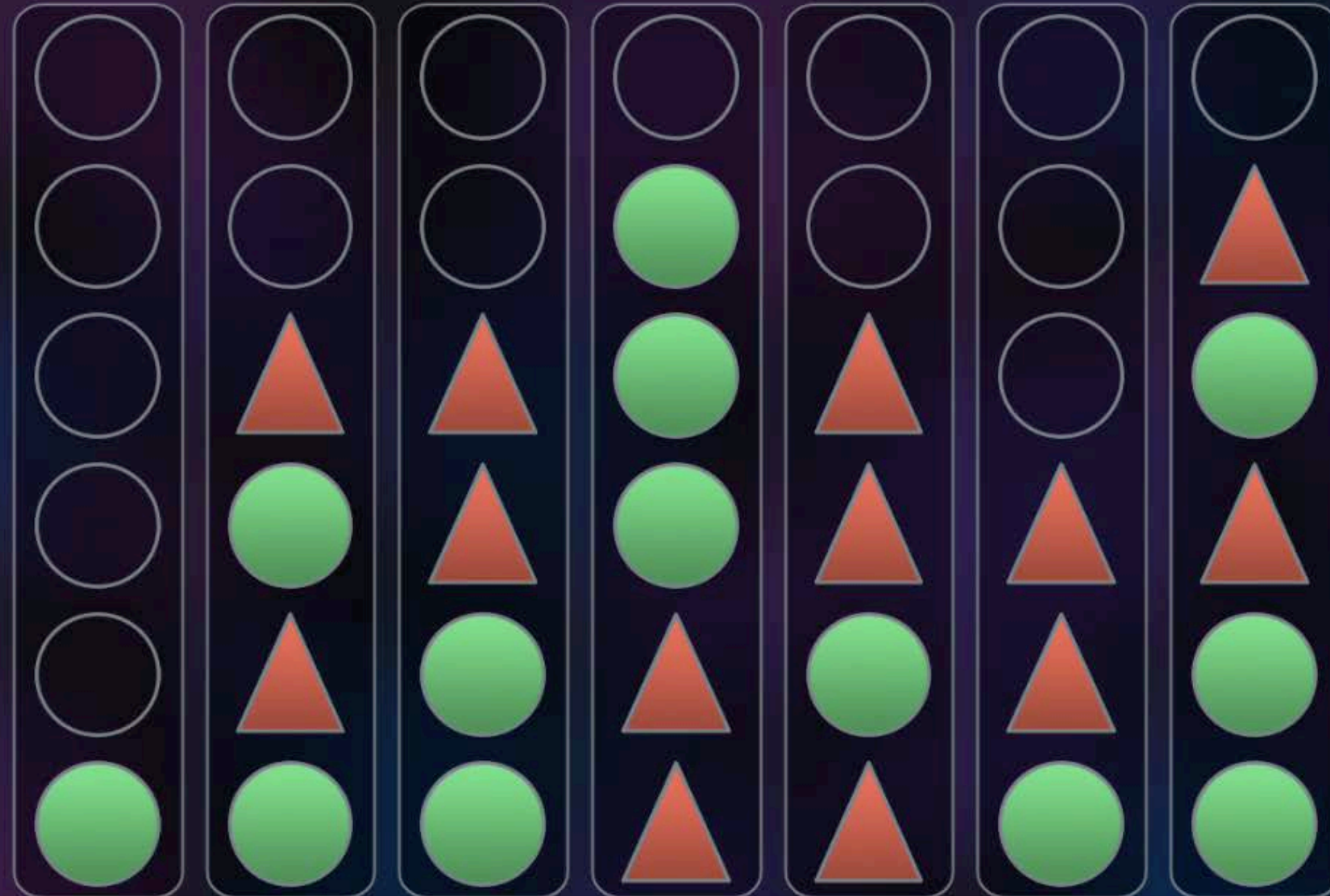
New Game

Auto Play

Settings

Help

Leaderboards



Turn: Player B
Winner: Player B
Time:

New Game

Auto Play

Settings

Help

Leaderboards

Hearing

Hearing



Provide different modes for getting information, like speech and text

Hearing



Provide different modes for getting information, like speech and text



Use full-spectrum sounds and add audio options

Hearing



Provide different modes for getting information, like speech and text



Use full-spectrum sounds and add audio options



Use multiple ways of getting the players' attention



Cognition

Audio and visuals

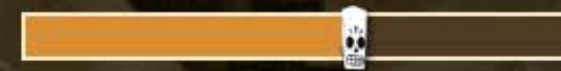
Help and tutorials

Guided Access

Game modes

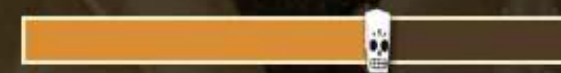
OPTIONS

Brightness



Brighter

Music Volume



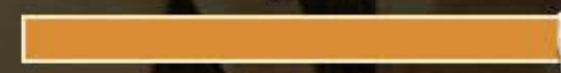
Medium

Sound Effects Volume



Medium

Voice and Movie Volume



High

Language

English

Text Mode

Voice and Text

< Return to Main Menu

A	A	A	A	R	R	R	R
9♥	10♠	8♣	9♣	7♣	5♣	4♥	3♣
2♣	2♦	J♥	7♥	5♥	10♦	6♠	3♦
7♠	9♠	7♦	Q♠	K♦	A♥	A♠	6♦
5♦	2♠	4♠	J♠	J♣	Q♣	8♥	10♥
8♠	4♦	8♦	9♦	K♣	4♣	2♥	6♥
A♦	A♣	Q♥	J♦	3♥	6♣	10♣	3♠
K♠	Q♦	5♠	K♥	♥	♣	♣	♠

Moves: 0 Score: -52 Time: 0:00

Baker's Game

How to Win

Play all cards into the foundation piles.

Foundation Piles

The 4 foundation piles are built upward in suit from Aces to Kings.



Tableau Columns

The 8 tableau columns are built downward in suit.

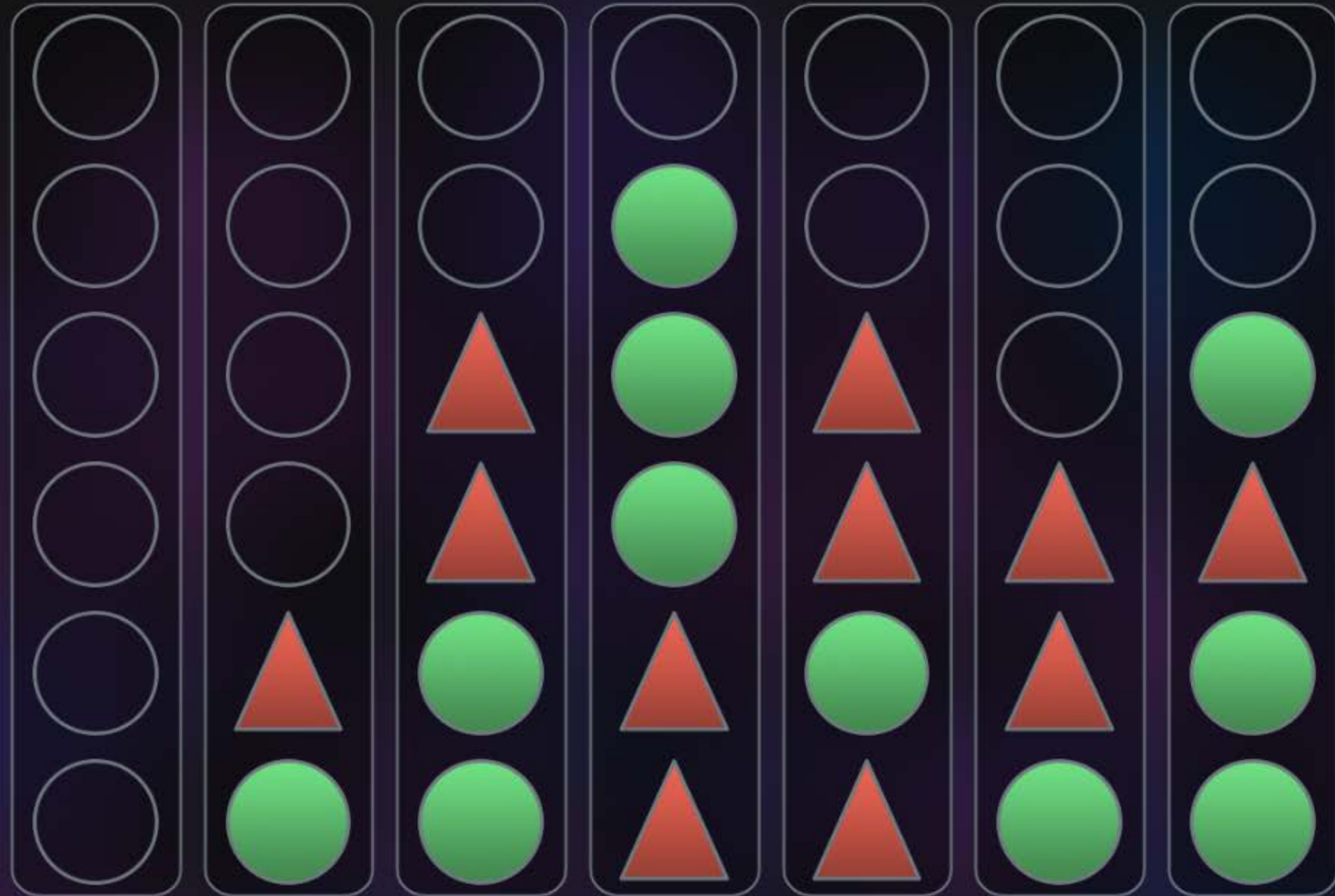


Any card may be played into an empty tableau space.

Uncovered end cards are available for play.

As a shortcut, cards built in sequence may be moved together if there are enough empty reserves and tableau columns to unstack





Turn: Player A
Winner: ????

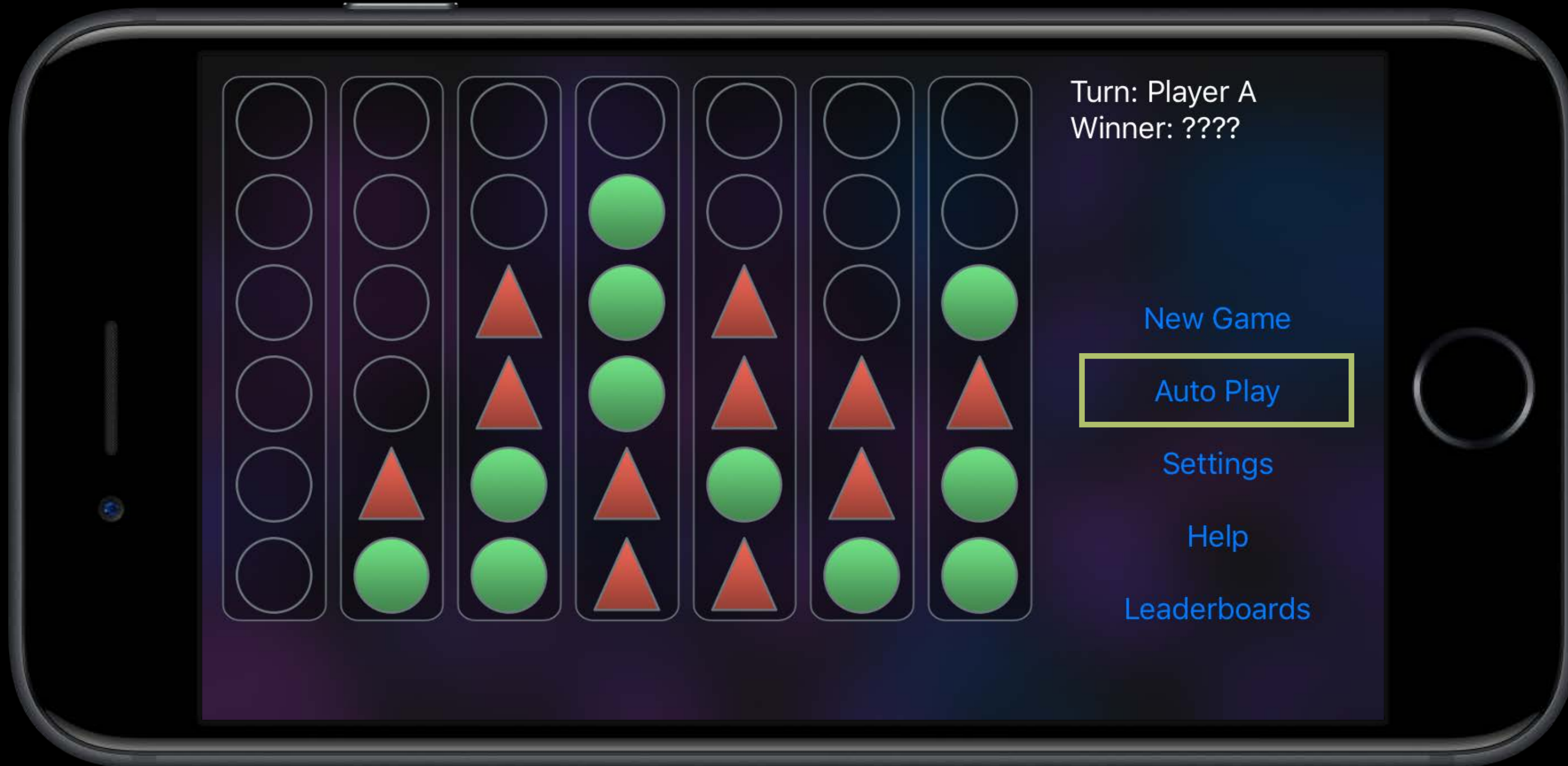
New Game

Auto Play

Settings

Help

Leaderboards



Turn: Player A
Winner: ????

New Game

Auto Play

Settings

Help

Leaderboards

```
import UIKit
```

```
@UIApplicationMain
```

```
class AppDelegate: UIResponder, UIApplicationDelegate, UIGuidedAccessRestrictionDelegate {
```

```
    var window: UIWindow?
```

```
    var guidedAccessRestrictionIdentifiers: [String]? =  
    ["AutoPlayButtonRestrictionIdentifier"]
```

```
func textForGuidedAccessRestriction(withIdentifier restrictionIdentifier: String) ->
String? {
    return NSLocalizedString("autoPlayButtonDescription", comment: "description for the
auto play button")
}

func guidedAccessRestriction(withIdentifier restrictionIdentifier: String, didChange
newRestrictionState: UIGuidedAccessRestrictionState) {
    NotificationCenter.default.post(name:
NSNotification.Name("autoPlayButtonRestrictionChanged"), object: nil, userInfo: ["status":
newRestrictionState])
}
}
```


DRIVER ASSISTS

Customize your driving experience.



Steering Assist

OFF LOW HIGH



Traction Control

OFF ON



Brake Assist

OFF LOW HIGH

OK

[← Back](#)

Timed Mode



Turn Time



[← Back](#)



Tap to rate this game



Facebook Liking
Unavailable

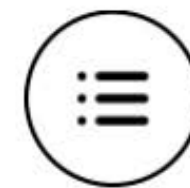
Achievements

Leaderboards

Challenges



Timed mode
#1 overall



Untimed mode
#12 overall

Cognition

Cognition



Use multiple methods for delivering content, like speech with text

Cognition



Use multiple methods for delivering content, like speech with text



Make instructions and tutorials easy to access

Cognition



Use multiple methods for delivering content, like speech with text



Make instructions and tutorials easy to access



Support Guided Access

Cognition



Use multiple methods for delivering content, like speech with text



Make instructions and tutorials easy to access



Support Guided Access



Provide different game modes or levels with their own leaderboards

Demo

Demo

Demo



Games should be fun for everyone

Demo



Games should be fun for everyone



Use the accessibility APIs to enhance the experience

How to Get Started

How to Get Started

Audit your app

How to Get Started

Audit your app

Try different accessibility settings

How to Get Started

Audit your app

Try different accessibility settings

Talk to assistive technology users

Auditing your Apps for Accessibility

<https://developer.apple.com/videos/play/wwdc2016/407/>

Related Sessions

Connect 

Accessible Technology and Inclusive Design Get-Together

The Hub

Wednesday 6:30PM

Inclusion and Diversity Get-Together

Market Terrace

Wednesday 6:30PM

Summary

Summary

Accessibility means more people can enjoy your game

Summary

Accessibility means more people can enjoy your game

Design different kinds of great experiences

Summary

Accessibility means more people can enjoy your game

Design different kinds of great experiences

Adding accessibility creates richer gameplay for everyone

More Information

<https://developer.apple.com/wwdc17/217>

Related Sessions

Preparing and Presenting Media for Accessibility

WWDC 2013

What's New in Accessibility

WWDC 2016

Auditing Your Apps for Accessibility

WWDC 2016

Advances in HTTP Live Streaming

Grand Ballroom B

Tuesday 5:10PM

What's New in Accessibility

Grand Ballroom A

Wednesday 1:50PM

Design for Everyone

Hall 3

Thursday 11:00AM

Building Apps with Dynamic Type

Executive Ballroom

Friday 1:50PM

Labs

Accessibility Design By Appointment Lab

User Interface Design Lab B

Tue 10:00AM–6:00PM

Accessibility Design By Appointment Lab

User Interface Design Lab B

Tue–Fri 9:00AM–6:00PM

Accessibility Lab

Technology Lab J

Wed 4:10PM–6:00PM

Accessibility and Dynamic Type Lab

Technology Lab C

Fri 2:30PM–4:00PM

