you-win: API Reference

Importing

`you-win` exports the following names:

- init
- World
- Sprite
- Text
- Polygon
- Phone
- Sound

To import all these names so you can use them in your code, use the following line:

```
import UW from 'you-win'
import {forever, Phone, World, Sprite, Text, Polygon} from 'you-win'
```

Assets

Before you can do anything, you need initialise `you-win`. You do this by calling `UW.init`.

```
UW.init({
    // the images you need
})
.then(() => {
    // make your world and game
})
```

- **`UW.init(images)`**

  Pulls in the media files you need for your game. The code **after `then`** will run once they're all ready.

  Displays a progress bar while the media files are downloading.

Costumes

A **costume** is an image that controls how a `Sprite` looks.

You create costumes inside `UW.init`, by giving their URL (web address).

```
UW.init({
    asteroid: '/asteroid.jpg',
})
```

> ⚠ Because of security restrictions, you can't use just any image URL from any website. Assets stored in your Glitch project will work fine; copy their URL here.

If you make a `static` folder in the same place as your game's `.js` file, you can put images inside it, and then load them here using the URL `'/my-image.jpg'`.

```
UW.init({
    // get asteroid.jpg from my `static` folder
    asteroid: '/asteroid.jpg',
    face: 'https://cdn.glitch.com/f213ed6a-d103-4816-b60d-47c712a926e2%2Fcat_00.png',
})
```

Emoji costumes

Emoji costumes are loaded by default. To use them, just set your Sprite's `.costume` attribute to an emoji string:

```
var s = new Sprite
s.costume = '🙂'
```

The emoji costumes are sized 32x32 pixels. Most but not all emoji are included.

Emoji make great placeholder graphics for your game, or even final graphics if you like the retro pixel-art theme.

You can also use emoji inside Text.

World

`World` sets up the screen, manages all the sprites, and emits events such as taps and drags on the background.

Set up the world after loading your assets.

```
UW.init({
    // ...
})
.then(world => {

    var world = new World
    world.width = 300
    world.height = 460

    // make sprites...

})
```

It has the following attributes:

- **`world.width` / `world.height`**

  The size of the game's visible area on the screen.

  If you don't provide a width or height when making your world, it will default to using the size of the phone's screen.

- **`world.scrollX` / `world.scrollY`**

  An offset applied to all of the objects on-screen.

  You can change these in order to move around the virtual “camera” to show different parts of the world, e.g. for writing a platformer.

  But be aware, the X and Y positions of your sprites won’t change when you scroll; so a sprite at *(0, 0)* will no longer be in the bottom-left corner of the screen!

- **`world.background`**

  The background colour of the world. Uses HTML/CSS colours, such as `red` or `#007de0`.

World has the following methods:

- **`world.stop()`**

Sprite

A **`Sprite`** is an image in the world that can be moved and rotated and so on.

To create a Sprite, you must give the name of one of your costumes. (For experts: you may also include an object with additional attributes.)

```
UW.init({
  'cat': 'https://cdn.glitch.com/f213ed6a-d103-4816-b60d-47c712a926e2%2Fcat_00.png?1499126150626',
})
.then(() => {

    var cat = new Sprite
    cat.costume = 'cat'

    var bigCat = new Sprite
    bigCat.costume = 'cat'
    bigCat.scale = 2 // twice as big

})
```

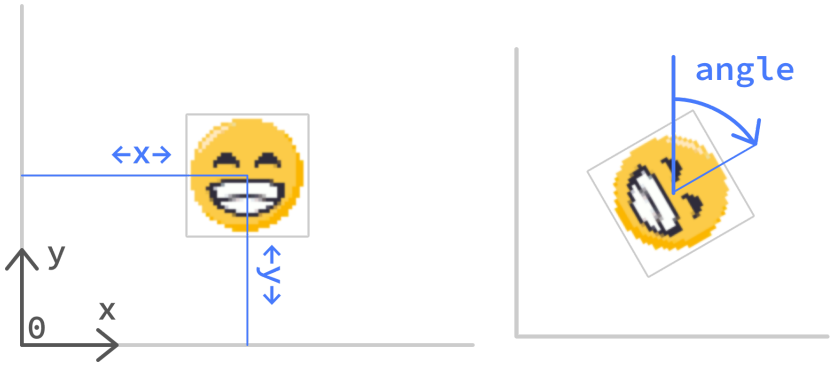
Sprites have quite a few attributes which you can change. You can also set their initial values when you make the sprite.

- **`sprite.posX` / `sprite.posY`**

  The X and Y co-ordinates of the center of the sprite, starting from the bottom-left corner of the screen.

- **`sprite.angle = 0`**

  The rotation of the sprite, going clockwise.



- **`sprite.scale = 1.0`**

  The scale factor of the sprite. `1.0` means 100%; `2.0` is twice the size; `0.5` is half the size.

- **`sprite.flipped = false`**

Either `true` or `false`.

Whether to flip the sprite's costume, so that it faces the other way. Defaults to `false.

- **`sprite.opacity = 1.0`**

  Controls the sprite's opacity aka. alpha aka. transparency aka. "ghost" effect.

  A value of `1.0` means the sprite is fully **opaque**; `0.0` means the sprite is fully see-through.

  If you want to remove the sprite entirely and permanently, use `destroy()`.

- **`sprite.costume = 'poop'`**

  The image to use for the sprite, in case you want to change it later. For example, if you want to cycle between several images in order to "animate" the sprite".

  You can also give an emoji here, to get one of the built-in emoji costumes (assuming `you-win` supports that emoji).

- **`sprite.left`** / **`sprite.right`** / **`sprite.top`** / **`sprite.bottom`**

  The co-ordinates of the edges of the *bounding box* of the sprite. The bounding box is an *axis-aligned* box enclosing the whole sprite.

  TODO: diagram

  These can be useful for getting or changing the position of the edge of a sprite. They tend to be more useful for non-rotated sprites.

  > **Important:** you usually need to assign these last. If you set the the position of an edge, and then for example change the `scale`, the edge won't line up anymore! So make sure you set edge positions after setting the other attributes.

Sprites have some useful functions attached to them.

- **`sprite.raise()`**

  Bring the sprite to the front, so that it is above all the other sprites.

- **`sprite.lower()`**

  Send the sprite to the back, below all the other sprites.

- **`sprite.getTouching()`**

  Returns a list of sprites which are overlapping this one.

  Useful for detecting collisions!

  ```
  for (var other of player.getTouching()) {
      if (other.isBullet) {
          // lose some health
      }
  }
  ```

- **`sprite.getTouchingFast()`**

  The same as `getTouching`, but avoids the accurate-but-slow Scratch-like pixel-perfect collision detection, which compares the images of the two sprites pixel-by-pixel.

- **`sprite.isTouching(otherSprite)`**

  Returns `true` if the two sprites are overlapping; `false` otherwise.

- **`sprite.isTouchingFast(otherSprite)`**

  The same as `isTouching`, but avoids the accurate-but-slow Scratch-like pixel-perfect collision detection, which compares the images of the two sprites pixel-by-pixel.

- **`sprite.touchesPoint(x, y)`**

  Returns `true` if the point overlaps the sprite; `false` otherwise.

  You probably won't need this, but it can be useful if you're doing complicated things involving `drag` events.

- **`sprite.isTouchingEdge()`**

  Returns `true` if the sprite is near to the edge; `false` otherwise.

- **`sprite.isOnScreen()`**

  Returns `false` if the sprite is completely off the screen; `true` otherwise.

This takes into account scrolling.

- **`sprite.destroy()`**

  Remove the sprite from the screen. Afterwards, the sprite is “dead” and you can’t use it anymore.

  If you just want to hide the sprite for a moment, set its `opacity` to zero.

Sprite::forever

`forever` is really useful function: it lets you do something on every “frame” or “tick” of your game. Usually ticks happen 60 times a second (60 FPS).

Write a forever loop with a function just inside it, like so:

```
sprite.forever(() => {
    // do stuff
})
```

Any code after the forever loop isn’t affected:

```
sprite.forever(() => {
    // do stuff
})

sprite.forever(() => {
    // do other stuff
})

// carry on setting up the game ...
```

If you want to **stop** a `forever` loop (so that it doesn’t run forever!), you can `return false`:

```
player.forever(() => {
    if (player.isTouching(floor)) { // the floor is lava
        // game over!
        return false // stop this loop
    }
    // otherwise, move the player...
})
```

A `forever` loop will automatically be stopped when the Sprite that it's attached to gets destroyed.

Text

A **Text** object is like a Sprite, but instead of a costume, it's used to display *text*.

The text has a retro aesthetic. It also supports emoji (using the same emoji set as Sprites can use). Which means that this:

```
var snowy = new Text
snowy.text = '⛄'
```

…is quite similar to this:

```
var snowy = new Sprite
snowy.costume = '⛄'
})
```

`Text` objects have all the same attributes as a Sprite–but instead of a `costume`, they have the following:

- **`obj.text`**

  The text to display.

- **`obj.fill`**

  The color of the text, e.g. `text.fill = '#007de0'`

Polygon

A **Polygon** is like a Sprite, but has a *shape* instead of a costume. This shape is defined using a list of points. Examples include making a filled rectangle, a triangle with a fill and an outline, and thick lines.

Here's an example Polygon:

```
var p = new Polygon
p.points = [[0, 0], [0, 32], [32, 32], [32, 0]]
p.fill = '#007de0'
p.outline = 'black'
p.thickness = 2
})
```

`Polygon`s have all the same attributes as a Sprite–but instead of a `costume`, they have the following:

- **`polygon.points`**

  A list of points. Each point is a 2-element list with the X and Y coordinates (relative to the polygon's center), like so:

  ```
  p.points = [[0, 0], [-16, 20], [16, 20]]
  ```

- **`polygon.fill`**

  The color painted inside the shape, e.g. `polygon.fill = '#007de0'`.

  Leave out this setting, or set it to `null`, for no fill (just an outline).

- **`polygon.outline`**

  The outline color, e.g. `polygon.outline = 'black'`.

  Leave out this setting, or set it to `null`, for no outline. You must specify *either* a fill or an outline (or both).

- **`polygon.thickness`**

  How thick to draw the outline (in pixels). Defaults to 2.

- **`polygon.closed`**

  Whether the last point should be joined to the first one, to make a closed shape.

  Defaults to `true` for filled polygons. **TODO:** saner default handling.

Rect

A `Rect` is a special sort of Polygon which, unsurprisingly, is shaped like a rectangle.

Instead of a `costume`, `Rect`s have the following:

- **`rect.width`** / **`rect.height`**

  The dimensions of the rectangle.

- **`rect.fill`** / **`rect.outline`** / **`rect.thickness`**

  The fill color, outline color, and width of the outline.

  See Polygon for more details.

Touch Events

An **event** tells you that something has happened. Both Worlds and Sprites will emit events when they are tapped or dragged.

If a tap overlaps more than one sprite (because the sprites are overlapping), then the sprites are told about the events in order. The front-most one sees the event first.

If a sprite wants to handle an event, it should `return true`. From then on, no other sprites (nor the `world`!) will see the event.

There are a few kinds of event:

- **`world.onTap(e => { ... })`** / **`sprite.onTap(e => { ... })`**

  A `tap` event happens when a finger is pressed against the screen and let go without moving.

  The event object `e` has the following attributes:

  - **`e.fingerX`** / **`e.fingerY`**: the coordinates of the tap.

- **`world.onDrag(e => { ... })`** / **`sprite.onDrag(e => { ... })`**

  The event object `e` has the following attributes:

  - **`e.startX`** / **`e.startY`**: the coordinate the drag started from.
  - **`e.deltaX`** / **`e.deltaY`**: the amount the finger has moved since the last drag event.
  - **`e.fingerX`** / **`e.fingerY`**: the current coordinates of the drag.

  If the Sprite doesn't want to hear about the event anymore, it can `return false`.

- **`world.onDrop(e => { ... })`** / **`sprite.onDrop(e => { ... })`**

If you're testing your game on a computer, mouse clicks and drags will work to simulate touches – but remember that unlike fingers, a mouse pointer can only be in one place at a time!

Detecting taps

```
world.onTap(e => {
    // make a ball where you clicked
    var ball = new Sprite
    ball.costume = 'beachball'
    ball.posX = e.fingerX
    ball.posY = e.fingerY

    ball.onTap(e => {
        // flip
        ball.flipped = !ball.flipped

        // handle the event
        // - otherwise another ball will get spawned!
        return true
    })
})
```

Dragging sprites around

```
var ball = new Sprite
ball.costume = 'beachball'
ball.onDrag(e => {
    // move when dragged
    ball.posX += e.deltaX
    ball.posY += e.deltaY
    return true
})
```

Touches list

Detecting fingers held down

Sometimes you don't want to listen for events: you just want to know where fingers are touching the screen, **right now**. To do this, you can use `getFingers()`.

- **`world.getFingers()`**

Returns an `Array` containing a list of each finger currently touching the screen.

You can use a `for...of` loop to go through each finger in turn:

```
for (let e of world.getFingers()) {
    if (e.fingerX < world.width / 2) {
        // touching the left side of the screen
    } else if (e.fingerX > world.width/ 2) {
        // touching the right side of the screen
    }
}
```

Each finger is an *event* object, just like the `e` argument passed to `onTap` or `onDrag`.

Phone

`Phone` provides access to sensors on a smartphone, such as the accelerometer. You can use this to control your game depending on how the phone is held; for example tilting to steer in a racing game.

You need to make a `Phone` object before you can access the readings:

```
var phone = new Phone
```

It has the following attributes which you can get:

- **`phone.zAngle`**: the angle of the phone's screen in relation to the ground.

  An angle of `0` means the phone is held upright. Tilt the phone to see it change.

Sound

To use sounds, make sure to `import {Sound} from 'you-win'`.

To load a sound , use `Sound.load`. See Assets for details on the `static/` folder and where to put your sound files.

```
UW.init({
  moo: Sound.load('/moo.wav'),
})
.then(() => {

})
```

Before you can play your sound, you must create a `Sound` object.

```
  var sound = new Sound('moo')
```

Finally, you can play your sound at the appropriate time.

```
    sound.play()
```

Maths

Some built-in maths utilities.

- **`UW.range([start], end, [step])`**

  Return a list of numbers starting at `start` (default `0`), and ending before `end`. Behaves identically to Python's `range()`.

  The optional `step` argument (default `1`) is how much to move between each item.

  ```
  UW.range(5) // => [0, 1, 2, 3, 4]
  UW.range(5, 10) // => [5, 6, 7, 8, 9]
  UW.range(10, 20, 2) // => [10, 12, 14, 16, 18]
  UW.range(0, -5, -1) // => [0, -1, -2, -3, -4]
  ```

- **`UW.dist(dx, dy)`**

  The distance between (0, 0) and (dx, dy), calculated using Pythagoras' Theorem.

Some trigonometric functions. These work in degrees, unlike the ones built-in to JavaScript which use radians.

- **`UW.sin(deg)`**
- **`UW.cos(deg)`**
- **`UW.atan2(x, y)`**

Random

Some built-in ways of getting random things are included.

- **`UW.randomInt(from, to)`**

  Return a random integer (whole number) between `from` and `to`, inclusive.

  ```
  UW.randomInt(1, 3) // => 2
  UW.randomInt(1, 3) // => 1
  UW.randomInt(1, 3) // => 3
  ```

- **`UW.randomChoice(array)`**

  Return a randomly-selected item of an array.

  ```
  UW.randomChoice(['🐄', '🐐', '🐎']) // => '🐐'
  ```