

# *Accessibility in React Applications*

React Zurich Meetup – April 2019

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*Why should we care about a11y?*

**1**

*It affects more people than you think.*

*1.3 billion people with disabilities.*

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*1.3 billion people with disabilities.*

**2** *It will become mandatory.*  
*In some countries or fields, it already is.*

**1** *It affects more people than you think.*  
*1.3 billion people with disabilities.*

**2** *It will become mandatory.*  
*In some countries or fields, it already is.*

**3** *It's not as hard as you think.*  
*Web Technologies and Tools are getting better.*

*The current state of the web.*

# ***The WebAIM Million***

An automated accessibility analysis of the top 1,000,000 home pages.

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# ***The WebAIM Million***

An automated accessibility analysis of the top 1,000,000 home pages.

**30%** can be verified with **automation**.

**97.8%** pages with accessibility **failures**.

**+10.1%** errors in **React** websites.

*We are preventing people  
from using our websites.*

*We need to do **way** better.*

# *What's in for today*

*1 Structure Patterns*

*2 Interaction Patterns*

*3 Application Patterns*

# *Structural Patterns*



# Landmarks

They guide screen readers through the website.



The screenshot shows a web browser window with the URL <https://en.wikipedia.org/wiki/Porto>. The page title is "Porto - Wikipedia". The Wikipedia logo is visible on the left. The main content area displays the article for "Porto". The article text describes Porto as the second-largest city in Portugal after Lisbon, with a population of 287,591 and a metropolitan area of 2.3 million. It mentions that Porto is a gamma-level global city and a World Heritage Site. The article also notes that Porto is located along the Douro River estuary and is one of the oldest European centres. The article text is partially obscured by a gallery of images on the right side of the page. The gallery is titled "Porto Municipality" and contains several photographs of the city's architecture and landmarks.

Wikipedia  
The Free Encyclopedia

Main page  
Contents  
Featured content  
Current events  
Random article  
Donate to Wikipedia  
Wikipedia store

Interaction  
Help  
About Wikipedia  
Community portal  
Recent changes  
Contact page

Tools  
What links here  
Related changes  
Upload file  
Special pages

Article **Porto** Read Edit View history

From Wikipedia, the free encyclopedia

Coordinates: 41°9′43.71″N 8°37′19.03″W﻿ / ﻿41.16225°N 8.62195°W﻿ / 41.16225; -8.62195

*"Oporto" redirects here. For other uses of Porto and Oporto, see [Porto \(disambiguation\)](#).*

**Porto** (Portuguese pronunciation: [ˈpoɾtu]) is the **second-largest city** in **Portugal** after **Lisbon**<sup>[3]</sup> and one of the major urban areas of the **Iberian Peninsula**. The city proper has a population of 287,591 and the metropolitan area of Porto, which extends beyond the administrative limits of the city, has a population of 2.3 million (2011)<sup>[4]</sup> in an area of 2,395 km<sup>2</sup> (925 sq mi),<sup>[5]</sup> making it the second-largest urban area in Portugal.<sup>[3][7][8]</sup> It is recognized as a **gamma-level global city** by the Globalization and World Cities (GaWC) Study Group,<sup>[9]</sup> the only Portuguese city besides Lisbon to be recognised as a global city.

Located along the **Douro River estuary** in northern Portugal, Porto is one of the oldest **European** centres, and its historical core was proclaimed a **World Heritage Site** by **UNESCO** in 1996. The western part of its urban area extends to the coastline of the **Atlantic Ocean**. Its settlement dates back many centuries, when it was an outpost of the **Roman Empire**. Its combined **Celtic-Latin** name, **Portus Cale**,<sup>[10]</sup> has been referred to as the origin of the name "Portugal", based on **transliteration** and oral evolution from Latin. In Portuguese, the name of the city is spelled with a **definite article**: *a Porto*. Consequently, its English name, *Oporto*.

**Porto**  
**Municipality**

The gallery contains several photographs of the city's architecture and landmarks, including the Douro River, the Porto Cathedral, and the Porto City Hall.

*HTML5*

*Role*

## *HTML5*

## *Role*

*<header />*

*banner \**

\* Does not apply if descendant of ***article***, ***aside***, ***main***, or ***section***.

## *HTML5*

## *Role*

*<header />*

*banner \**

*<main />*

*main*

\* Does not apply if descendant of ***article***, ***aside***, ***main***, or ***section***.

\*\* Requires labelling (more on that later).

<i>HTML5</i>	<i>Role</i>
<code>&lt;header /&gt;</code>	<i>banner *</i>
<code>&lt;main /&gt;</code>	<i>main</i>
<code>&lt;footer /&gt;</code>	<i>contentinfo</i>

\* Does not apply if descendant of ***article***, ***aside***, ***main***, or ***section***.

## *HTML5*

## *Role*

*<header />*

*banner \**

*<main />*

*main*

*<footer />*

*contentinfo*

*<nav />*

*navigation*

\* Does not apply if descendant of ***article***, ***aside***, ***main***, or ***section***.

<i>HTML5</i>	<i>Role</i>
<code>&lt;header /&gt;</code>	<i>banner *</i>
<code>&lt;main /&gt;</code>	<i>main</i>
<code>&lt;footer /&gt;</code>	<i>contentinfo</i>
<code>&lt;nav /&gt;</code>	<i>navigation</i>
<code>&lt;section /&gt;</code>	<i>region **</i>

\* Does not apply if descendant of ***article***, ***aside***, ***main***, or ***section***.

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<i>HTML5</i>	<i>Role</i>
<code>&lt;header /&gt;</code>	<i>banner *</i>
<code>&lt;main /&gt;</code>	<i>main</i>
<code>&lt;footer /&gt;</code>	<i>contentinfo</i>
<code>&lt;nav /&gt;</code>	<i>navigation</i>
<code>&lt;section /&gt;</code>	<i>region **</i>
<code>&lt;form /&gt;</code>	<i>form</i>

\* Does not apply if descendant of ***article***, ***aside***, ***main***, or ***section***.

\*\* Requires labelling (more on that later).

<i>HTML5</i>	<i>Role</i>
<code>&lt;header /&gt;</code>	<i>banner *</i>
<code>&lt;main /&gt;</code>	<i>main</i>
<code>&lt;footer /&gt;</code>	<i>contentinfo</i>
<code>&lt;nav /&gt;</code>	<i>navigation</i>
<code>&lt;section /&gt;</code>	<i>region **</i>
<code>&lt;form /&gt;</code>	<i>form</i>
<code>&lt;aside /&gt;</code>	<i>complementary</i>

\* Does not apply if descendant of ***article***, ***aside***, ***main***, or ***section***.

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<code>&lt;header /&gt;</code>	<i>banner *</i>
<code>&lt;main /&gt;</code>	<i>main</i>
<code>&lt;footer /&gt;</code>	<i>contentinfo</i>
<code>&lt;nav /&gt;</code>	<i>navigation</i>
<code>&lt;section /&gt;</code>	<i>region **</i>
<code>&lt;form /&gt;</code>	<i>form</i>
<code>&lt;aside /&gt;</code>	<i>complementary</i>
	<i>search</i>

\* Does not apply if descendant of ***article***, ***aside***, ***main***, or ***section***.

\*\* Requires labelling (more on that later).

```
<body>
  <header>
    <h1>ACME Corp</h1>
    <nav aria-label="Main">
      <a href="/projects">Projects</a>
      <a href="/company">Company</a>
      <a href="/contact">Contact</a>
    </nav>
    <form role="search">
      <input type="search" aria-label="search text" />
      <button type="submit">Search</button>
    </form>
  </header>
  <main>
    <section aria-labelledby="region1">
      <h2 id="region1">Our projects</h2>
      ...
    </section>
  </main>
  <footer>
    <p>&copy; 2019 ACME Inc.</p>
    <nav aria-label="Secondary">
      <a href="/inprint">Inprint</a>
      <a href="/terms">Terms & Condition</a>
      <a href="/privacy">Privacy</a>
    </nav>
  </footer>
</body>
```

*HTML5 is a good starting point.*

```

<body>
  <header>
    <h1>ACME Corp</h1>
    <nav aria-label="Main">
      <a href="/projects">Projects</a>
      <a href="/company">Company</a>
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    </nav>
    <form role="search">
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      <button type="submit">Search</button>
    </form>
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      <h2 id="region1">Our projects</h2>
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    </nav>
  </footer>
</body>

```

*header, main and footer roles  
are automatically inferred.*

```
<body>
  <header>
    <h1>ACME Corp</h1>
    <nav aria-label="Main">
      <a href="/projects">Projects</a>
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  <main>
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      <a href="/privacy">Privacy</a>
    </nav>
  </footer>
</body>
```

*Override when the tag is not enough.*

```

<body>
  <header>
    <h1>ACME Corp</h1>
    <nav aria-label="Main">
      <a href="/projects">Projects</a>
      <a href="/company">Company</a>
      <a href="/contact">Contact</a>
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      <input type="search" aria-label="search text" />
      <button type="submit">Search</button>
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    </nav>
  </footer>
</body>

```

*Label **nav** when there is more than one in a page.*

*\* using “Secondary Navigation” is redundant.*

```
<body>
  <header>
    <h1>ACME Corp</h1>
    <nav aria-label="Main">
      <a href="/projects">Projects</a>
      <a href="/company">Company</a>
      <a href="/contact">Contact</a>
    </nav>
    <form role="search">
      <input type="search" aria-label="search text" />
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    </section>
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    <nav aria-label="Secondary">
      <a href="/inprint">Inprint</a>
      <a href="/terms">Terms & Condition</a>
      <a href="/privacy">Privacy</a>
    </nav>
  </footer>
</body>
```

*Visually, a search field doesn't have a label but we still need to add it.*

```
<body>
  <header>
    <h1>ACME Corp</h1>
    <nav aria-label="Main">
      <a href="/projects">Projects</a>
      <a href="/company">Company</a>
      <a href="/contact">Contact</a>
    </nav>
    <form role="search">
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    <nav aria-label="Secondary">
      <a href="/inprint">Inprint</a>
      <a href="/terms">Terms & Condition</a>
      <a href="/privacy">Privacy</a>
    </nav>
  </footer>
</body>
```

*You can use other elements as labels, when they are also visible on the page.*

# ***Forms***

*The thing everyone hates.*

*Some tips on how to make them better  
for visually-impaired users.*

***1. Always be labelling those inputs.***

# *1. Always be labelling those inputs.*

```
<form aria-labelledby="attend-title">
  <h2 id="attend-title">Attend React Zurich</h2>

  <label>
    Your name:
    <input type="text" name="name" placeholder="Michael Scott" />
  </label>

  <label htmlFor="company">Your company</label>
  <input type="text" name="company" id="company" placeholder="ACME Inc." />

  <button>RSVP</button>
</form>
```

*You can label an input by wrapping it in a label with text.*

# 1. Always be labelling those inputs.

```
<form aria-labelledby="attend-title">
  <h2 id="attend-title">Attend React Zurich</h2>

  <label>
    Your name:
    <input type="text" name="name" placeholder="Michael Scott" />
  </label>

  <label htmlFor="company">Your company</label>
  <input type="text" name="company" id="company" placeholder="ACME Inc." />

  <button>RSVP</button>
</form>
```

An alternative is to explicitly connect a label via *htmlFor* and *id* attributes.

# *1. Always be labelling those inputs.*

```
function InputCompany() {  
  return (  
    <>  
      <label htmlFor='company'>Company</label>  
      <input id='company' />  
    </>  
  );  
}
```

```
<InputCompany />
```

```
<InputCompany />
```

```
// error: same id is used twice.
```

***Even if your designer didn't put it there.***

Your username

*Even if your designer didn't put it there.*

Your username

```
let style = {
  border: 0,
  clip: 'rect(0 0 0 0)',
  height: '1px',
  width: '1px',
  margin: '-1px',
  padding: 0,
  overflow: 'hidden',
  position: 'absolute'
}

function VisuallyHidden({ Component = 'span', ...rest }) {
  return <Component style={style} {...rest} />
}
```

*Even if your designer didn't put it there.*

Your username

```
let style = {  
  border: 0,  
  clip: 'rect(0 0 0 0)',  
  height: '1px',  
  width: '1px',  
  margin: '-1px',  
  padding: 0,  
  overflow: 'hidden',  
  position: 'absolute'  
}  
  
function VisuallyHidden({ Component = 'span', ...rest }) {  
  return <Component style={style} {...rest} />  
}
```

```
<VisuallyHidden  
  Component='label'  
  htmlFor='username'>  
  Username:  
</VisuallyHidden>  
<input  
  placeholder='Your username'  
  id='username' />
```

## 2. Don't forget to also label forms.

```
<form aria-labelledby="attend-title">
  <h2 id="attend-title">Attend React Zurich</h2>

  <label>
    Your name:
    <input type="text" name="name" placeholder="Michael Scott" />
  </label>

  <label htmlFor="company">Your company</label>
  <input type="text" name="company" id="company" placeholder="ACME Inc." />

  <button>RSVP</button>
</form>
```

# *Decorative link icons*

See all Attendees →

# *Decorative link icons*

See all Attendees →

```
<a  
  href="/attendees"  
>  
  See all Attendees  
  <svg  
    aria-hidden="true"  
    xmlns="http://www.w3.org/2000/svg"  
    viewBox="0 0 24 24"  
  >  
    ...  
  </svg>  
</a>
```

# *Icon-only links*

**FOLLOW US ON**



# *Icon-only links*

FOLLOW US ON



```
<a  
  href="https://www.facebook.com/ACME-Inc"  
  aria-label="Find us on facebook"  
>  
  <svg aria-hidden="true">...</svg>  
</a>
```

# *Interaction Patterns*



# ***Form Validation***

# *Form Validation*

```
<Formik>
  ({ { values, errors, touched } }) => (
    <form>
      <label>
        Name:
        <input
          name="name"
          value={values.name}
          aria-describedby='nameError'
        />
        <span id='nameError' aria-live='polite'>
          {errors.name || null}
        </span>
      </label>
    </form>
  )
</Formik>
```

***Formik*** is a package to handle form validation.

# *1. Associate inputs with their error elements.*

```
<Formik>
  ({ values, errors, touched }) => (
    <form>
      <label>
        Name:
        <input
          name="name"
          value={values.name}
          aria-describedby='nameError'
        />
        <span id='nameError' aria-live='polite'>
          {errors.name || null}
        </span>
      </label>
    </form>
  )
</Formik>
```

## 2. *Show errors as the user types.*

```
<Formik>
  ({ { values, errors, touched } }) => (
    <form>
      <label>
        Name:
        <input
          name="name"
          value={values.name}
          aria-describedby='nameError'
        />
        <span id='nameError' aria-live='polite'>
          {errors.name || null}
        </span>
      </label>
    </form>
  )
</Formik>
```

### 3. OR, show errors when the user finishes.

```
<Formik>
  ({ { values, errors, touched } }) => (
    <form>
      <label>
        Name:
        <input
          name="name"
          value={values.name}
          aria-describedby='nameError'
        />
        <span id='nameError' aria-live='assertive'>
          {errors.name && touched.name ? errors.name : null}
        </span>
      </label>
    </form>
  )
</Formik>
```

*Emphasize the importance of the message and causes screen readers to interrupt their current tasks to read aloud this message.*

# Icon Toggles

The screenshot displays the Spotify web interface with a dark theme. The left sidebar contains navigation links: Home, Browse, Radio, YOUR LIBRARY, Made For You, Recently Played, Songs, Albums, Artists, Stations, Podcasts, and PLAYLISTS. The main content area shows the 'Indie Lusitano' playlist, created by Spotify, featuring 49 songs and 3 hours 8 minutes of music. The playlist cover art shows four men standing together. Below the cover, there are 'PLAY' and 'FOLLOWING' buttons, and a 'FOLLOWERS' count of 14,201. A table lists the songs in the playlist, including 'Waltz for Lovers', 'Still Your Girl', 'Southern Hype', 'Montes da Beira', 'Cascatas', 'Se Me Deixasses Ser', 'Moderno', 'Quinta-Feira', 'O Que Há por Cá', 'Meio Caminho Andado', and 'JOAQUIM - tema extra'. The right sidebar shows 'Friend Activity' with updates from users like bazel06, fabiomts, Inês João, and Silva Skenderi-Bro... At the bottom, there is a playback bar showing the current song 'Teresa' by Capitão Fausto, with a progress bar and volume controls.

Home  
Browse  
Radio  
YOUR LIBRARY  
Made For You  
Recently Played  
Songs  
Albums  
Artists  
Stations  
Podcasts  
PLAYLISTS  
Umbrella Academy (Netflix Soundtrack)  
SDer  
This Is Linda  
muse best of  
Indie Lusitano - by Spotify  
Sing It Back (Can 7 1930's Remix)  
Lana Del Rey - Lust For Life  
Discover Weekly  
Impulso Creativo  
New Playlist

Indie Lusitano  
PLAYLIST  
Os excelentes sons da nova geração de bandas portuguesas. Foto: Capitão Fausto  
Created by Spotify • 49 songs, 3 hr 8 min  
PLAY FOLLOWING ...  
FOLLOWERS 14,201

Filter Download

	TITLE	ARTIST	ALBUM		
+	Waltz for Lovers	The Happy Mess, ...	Waltz for Lovers	9 days ago	3:32
+	Still Your Girl	Best Youth	Still Your Girl	9 days ago	4:00
+	Southern Hype	Cave Story	Spider Tracks	9 days ago	5:41
+	Montes da Beira	Ciclo Preparatório	Se é para Perder, ...	9 days ago	3:04
+	Cascatas	Trêsper cento	Quadro	9 days ago	3:26
+	Se Me Deixasses Ser	Tiago Bettencourt	A Procura	9 days ago	4:00
+	Moderno	Glockenwisa	Plástico	9 days ago	2:46
+	Quinta-Feira	Dois mil e oito	Pés Frios	9 days ago	3:34
+	O Que Há por Cá	Garsa	Pa Pa Pa	9 days ago	3:16
+	Meio Caminho Andado	Anaquim	O Quarto de Anaqu...	9 days ago	3:25
+	JOAQUIM - tema extra	S. PEDRO	O FIM	9 days ago	3:03

Friend Activity  
bazel06  
a lot  
21 Savage  
Starred  
fabiomts  
The Top Break Monolog...  
Frank Sinatra  
Frank Sinatra  
Inês João  
Arte Quis Ser Vida  
Supernada  
Tugas&Notas  
Silva Skenderi-Bro...  
Mr. Jonas  
Counting Crows  
August And Everyt...  
FIND FRIENDS

Teresa +  
Capitão Fausto  
0:03 3:42

# *Icon Toggles*



# Icon Toggles



```
export function MuteButton({ muted = false, onMutedChange }) {  
  return (  
    <button  
      aria-pressed={muted}  
      onClick={onMutedChange}  
      aria-label='Mute'  
    >  
      <svg aria-hidden='true'>  
        { /* ... */ }  
      </svg>  
    </button>  
  )  
};
```

# *Icon Toggles*



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export function MuteButton({ muted = false, onMutedChange }) {  
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# *Icon Toggles*



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      <svg aria-hidden='true'>  
        { /* ... */ }  
      </svg>  
    </button>  
  )  
};
```

# *Application Patterns*



# *Routing*

DEMO TIME

# ***Routing Focus Management***

*When the new page mounts, focus on its outer container.*

# *Routing Focus Management*

*When the new page mounts, focus on its outer container.*

```
function MyPage() {  
  const pageRef = useRef(null);  
  useEffect(() => {  
    pageRef.current.focus();  
  }, []);  
  return (  
    <div tabIndex={-1} aria-labelledby="title" ref={pageRef}>  
      <h1 id='title'>My Title</h1>  
      { /* ... */ }  
    </div>  
  );  
}
```

# *Routing Focus Management*

*When the new page mounts, focus on its outer container.*

```
function MyPage() {  
  const pageRef = useRef(null);  
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    pageRef.current.focus();  
  }, []);  
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    <div tabIndex={-1} aria-labelledby="title" ref={pageRef}>  
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      { /* ... */ }  
    </div>  
  );  
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```

# *Routing Focus Management*

*When the new page mounts, focus on its outer container.*

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```

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    <div tabIndex={-1} aria-labelledby="title" ref={pageRef}>  
      <h1 id='title'>My Title</h1>  
      { /* ... */ }  
    </div>  
  );  
}
```

# ***Notifications***



# *Notifications*



```
<VisuallyHidden role="status" aria-live="polite">  
  One item was added to the card.  
</VisuallyHidden>
```

*new content will be announced without user interaction.*

# *Flash Messages*

✔ Your information was updated.

# Flash Messages

✓ Your information was updated.

```
function Announcements({ announcements }) {  
  return (  
    <div role="status" aria-live="polite" aria-atomic="true">  
      {announcements.map((item => (  
        <p>  
          <strong>  
            <svg aria-hidden="false" />  
            <VisuallyHidden>{item.type || 'Success'}</VisuallyHidden>  
          </strong>  
          {item.message}  
        </p>  
      )))}  
    </div>  
  );  
}
```

*Have a region of the website for these messages.*

# Flash Messages

✓ Your information was updated.

```
function Announcements({ announcements }) {  
  return (  
    <div role="status" aria-live="polite" aria-atomic="true">  
      {announcements.map((item => (  
        <p>  
          <strong>  
            <svg aria-hidden="false" />  
            <VisuallyHidden>{item.type || 'Success'}</VisuallyHidden>  
          </strong>  
          {item.message}  
        </p>  
      )))}  
    </div>  
  );  
}
```

*Mark icon as decorative.*

# Flash Messages

✓ Your information was updated.

```
function Announcements({ announcements }) {  
  return (  
    <div role="status" aria-live="polite" aria-atomic="true">  
      {announcements.map((item => (  
        <p>  
          <strong>  
            <svg aria-hidden="false" />  
            <VisuallyHidden>{item.type || 'Success'}</VisuallyHidden>  
          </strong>  
          {item.message}  
        </p>  
      )))}  
    </div>  
  );  
}
```

*Provide text alternative.*

# Flash Messages

✓ Your information was updated.

```
function Announcements({ announcements }) {  
  return (  
    <div role="status" aria-live="polite" aria-atomic="true">  
      {announcements.map((item => (  
        <p>  
          <strong>  
            <svg aria-hidden="false" />  
            <VisuallyHidden>{item.type || 'Success'}</VisuallyHidden>  
          </strong>  
          {item.message}  
        </p>  
      )))}  
    </div>  
  );  
}
```

*Only announce newly added content.*

*That's all we got time for today.*

# *aditus.io*

*I'll be sharing accessibility tips over the next months.*

