Tutorial #3: Working with Data

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Working with Data?

• Why?
  – Our application should be available on any client
  – We have to store ‘state’ of our web application

• Topics we will cover today
  – Firebase Database
  – How to store data in Firebase Database
  – How to retrieve data from Firebase and update UI

bit.ly/cs374-tut3
Learning Objective

• We will build a comment board

Hyeungshik: Hello CS374
Firebase

• Firebase is a set of services for building web / mobile applications easily

• Authentication, *Database*, Storage, Functions, Crash Analytics, User Analysis, etc

• Why Firebase?
  – Easy to start
Getting started with Firebase

• Prepare a Google account
• Go to http://firebase.google.com
• Start new project
Firebase Database

• Two types of database (Cloud Firestore vs Realtime Database)
• We will use Realtime Database
Firebase Database - Permission

• For this tutorial and homework, let’s use the test mode
Firebase Database - Structure

- Data should be stored in Key / Value structure
- Define your application state into Key / Value
Storing Data of Comment Board

name
comment

Hyeungshik: Hello CS374
Hyungyu: I miss you
Firebase Database - Realtime

• When the data change
  – Firebase emits event noticing that data changed
• We will use this property to keep our UI up to date.
Data Flow

name

comment

submit

comments

-LApxA9uXxyeEI0SCfo2

message: "Hello CS374"

name: "Hyeungshik"

key: "value"
Data Flow

name
comment
submit

Hyeungshik: Hello CS374
Hyeungshik: Hello CS374

Hyungyu: I miss you
Data Flow

<table>
<thead>
<tr>
<th>name</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyungyu</td>
<td>I miss you</td>
</tr>
</tbody>
</table>

Hyeungshik: Hello CS374

Fetch

Update

comments

- LApxA9uVxyel0SCfo2
  - message: "Hello CS374"
  - name: "Hyeungshik"

- LApxHktPuX2fcffyUqW
  - message: "I miss you"
  - name: "Hyungyu"
Data Flow

name
comment

Hyeungshik: Hello CS374

Fetch
Update
Fetch

comments
- -LApxA9uXxyeEi0SCfo2
  message: "Hello CS374"
  name: "Hyeungshik"
- -LApxHktPuX2fcffyUqW
  message: "I miss you"
  name: "Hyungyu"
Data Flow

Hyeungshik: Hello CS374

Hyungyu: I miss you
TODO1. Bind UI to data

Hyeungshik: Hello CS374
Hyungyu: I miss you

BIND

Update in data > Update in UI
TODO2. Update FB database

Hyeungshik: Hello CS374

name: Hyungyu
comment: I miss you

Update

Hyeungshik: Hello CS374
Setting Up Firebase

• Import Firebase JS SDK in codepen.io
  – `<script src="https://www.gstatic.com/firebasejs/4.0.0/firebase.js"></script>`
  – jQuery

• [https://firebase.google.com/docs/web/setup](https://firebase.google.com/docs/web/setup)
  – Web API Key
  – Database URL
Writing HTML
Accessing Firebase Database

- [https://firebase.google.com/docs/database/web/start](https://firebase.google.com/docs/database/web/start)
- We need ‘ref’ <- Reference to subset of whole database

```javascript
code
firebase.database().ref('comments')

firebase.database().ref('comments/0')
```

```
<table>
<thead>
<tr>
<th>comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
</tbody>
</table>
| message: "Hello CS374"
| name: ""Hyungsik"

<table>
<thead>
<tr>
<th>comments/0</th>
</tr>
</thead>
</table>
| message: "I miss you"
| name: ""Hyungyu"
```
Subscribing to Ref

- `Ref.on('value', callback)`
  - Call callback when ref is updated
  - We will update comments everytime ref is updated
- Called once when ref created

Hyeungshik: Hello CS374
Hyungyu: I miss you
Updating UI with Data

Object {
  -LApxA9uXxyeEi0Scfo2: Object {
  message: "Hello CS374",
  name: "Hyeungshik"
  },
  -LApxHktPuXZfcffyUqW: Object {
  message: "I miss you",
  name: "Hyungyu"
  }
}

[Object {
  message: "Hello CS374",
  name: "Hyeungshik"
}, Object {
  message: "I miss you",
  name: "Hyungyu"
}]

[{
  <div>
    <b>Hyeungshik</b> : <i>Hello CS374</i>
  </div>
  ", "
  <div>
    <b>Hyungyu</b> : <i>I miss you</i>
  </div>
}]

Push data

- Ref.push(value)
  - Add new entry with new key and value
  - ‘value’ event in Ref.on(‘value’, callback) will fire and ‘callback’ will be called
    - Our UI will be rendered again with new data
What we learned

• How to start Firebase project and database
• How to listen to firebase database and bind UI
• How to add item to firebase