

The Bot Framework Workshop

The poetry of programming

Daniel Egan

Bret Stateham

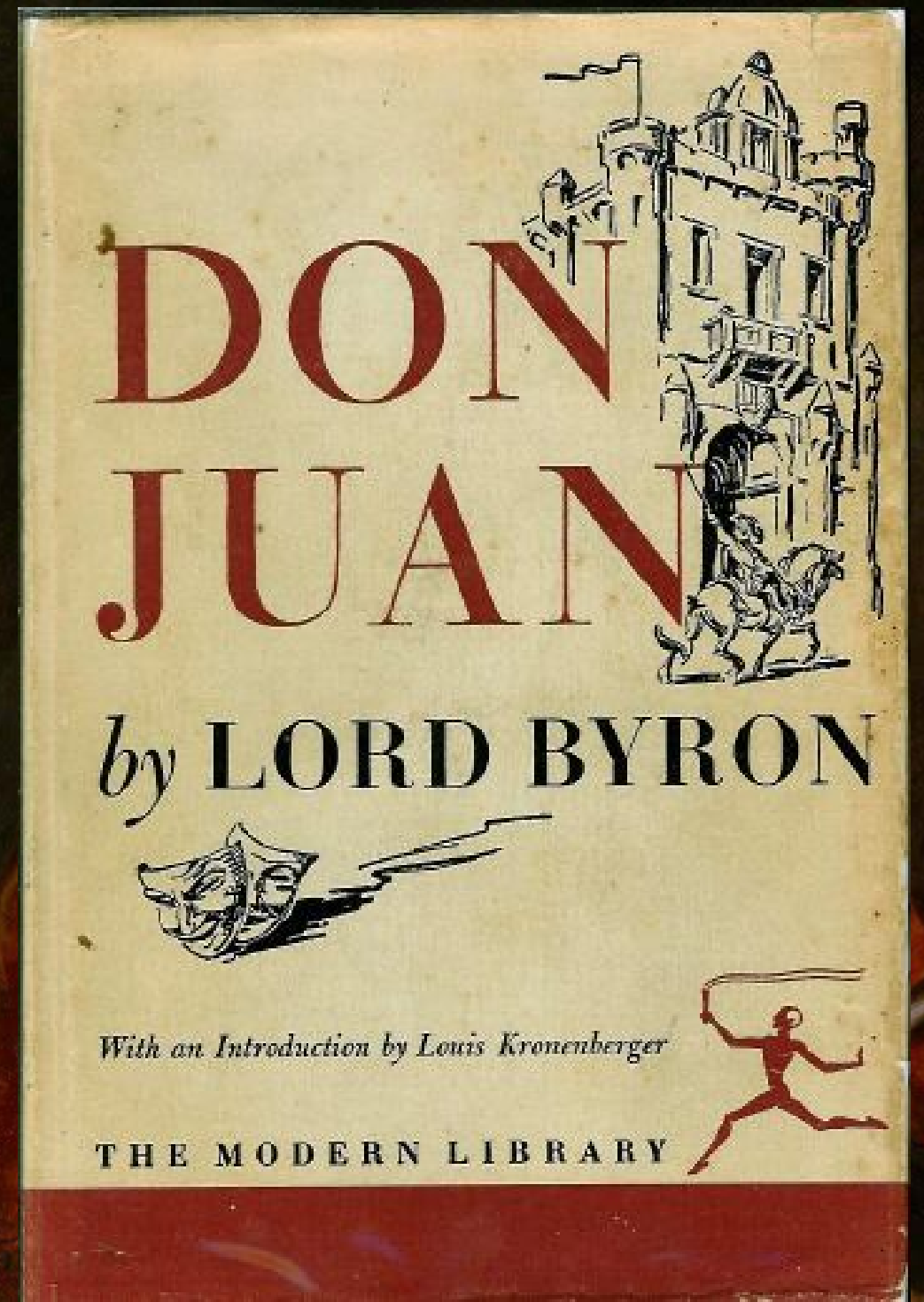
Michael Washington



Lord Byron

1788 - 1824

I know that two and two make four -
and should be glad to prove it too if I
could - though I must say if by any sort
of process I could convert 2 and 2 into
five it would give me much greater
pleasure. ~Lord Byron





Augusta Ada Byron
Countess of Lovelace



Ada Lovelace

1815 - 1852

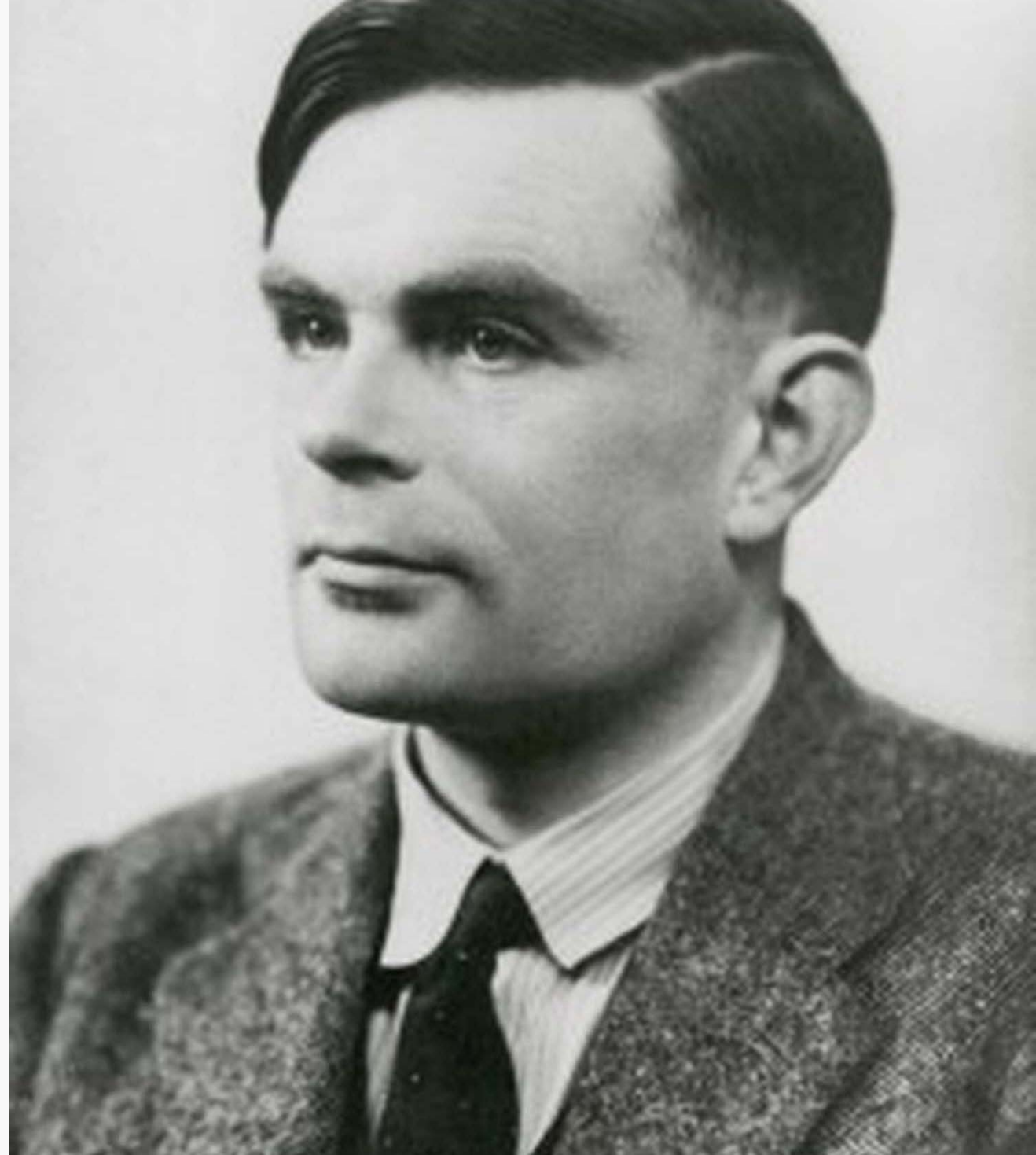
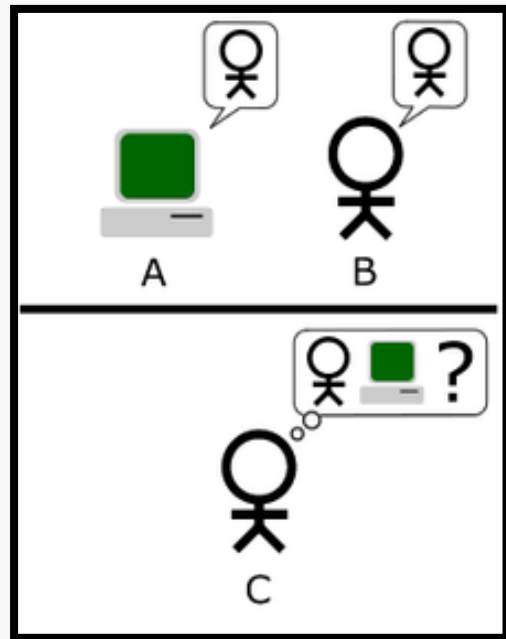
Credited (mostly) as first programmer

"The Analytical Engine has no pretensions whatever to originate anything. It can do whatever we know how to order it to perform. It can follow analysis; but it has no power of anticipating any analytical relations or truths."

Alan Turing

1912 - 1954

"Can machines think? The Turing test."



The Turing Test (1947-50)

- A machine can be said to be “intelligent” if it behaves exactly like a human being
- Hide a human in a room and a machine in another room and type them questions: if you cannot find out which one is which based on their answers, then the machine is intelligent

VOL. LIX. No. 236.]

[October, 1950]

MIND
A QUARTERLY REVIEW
OF
PSYCHOLOGY AND PHILOSOPHY

I.—COMPUTING MACHINERY AND
INTELLIGENCE

By A. M. TURING

www.scaruffi.com



Eliza

The first chat bot

[ELIZA](#) was a tongue-in-cheek simulation of a [Rogerian](#) therapist

Named after Eliza Doolittle from Pygmalion (or My Fair Lady)

Written by **Joseph Weizenbaum** between **1964** and **1966** at the MIT Artificial Intelligence Laboratory

<http://www.med-ai.com/models/eliza.html>

```
C:\ "D:\Document... Gonzalez Canelia\Desktop\Chatterbot Eliza 2.0\Debug\Eliza.exe"
HI USER, CAN YOU PLEASE TELL ME YOUR NAME?
>my name is Gonzales.
GLAD TO MEET YOU GONZALES.
>ok Eliza!
PLEASE BE MORE SPECIFIC.
>what do you mean by that?
SORRY I CAN'T PROVIDE MORE EXPLANATION ON THIS.
>why not?
WHY ARE YOU ASKING ME THIS?
>i dont know.
HOW COME YOU DONT KNOW?
>i'm just kidding.
WHAT MAKES YOU THINK THAT YOU ARE JUST KIDDING?
>well, because it is true.
SO YOU ARE TELLING ME THE REASON.
>yes, exactly.
YOU SOUND VERY OPTIMISTIC.
>thank you for the compliment!
DONT MENTION IT.
>ok.
PLEASE BE MORE SPECIFIC.
>i will try to be more specific next time.
DO YOU LIKE TALKING ABOUT YOURSELF?
>so, you think that i was talking about myself.
YOU ARE NOT REALLY TALKING ABOUT ME, ARE YOU?
>well, not really.
WHY ARE YOU SO UNCERTAIN?
```


Parry

The psychopath

written in 1972 by
psychiatrist [Kenneth Colby](#)

PARRY attempted to simulate a person
with [paranoid schizophrenia](#)

In 1972 Eliza Met Parry
Where they hooked up over [ARPANET](#)

```
C:\ "D:\Document... Gonzalez Canelia\Desktop\Chatterbot Eliza 2.0\Debug\Eliza.exe"

HI USER, CAN YOU PLEASE TELL ME YOUR NAME?
>my name is Gonzales.
GLAD TO MEET YOU GONZALES.
>ok Eliza!
PLEASE BE MORE SPECIFIC.
>what do you mean by that?
SORRY I CAN'T PROVIDE MORE EXPLANATION ON THIS.
>why not?
WHY ARE YOU ASKING ME THIS?
>i dont know.
HOW COME YOU DONT KNOW?
>i'm just kidding.
WHAT MAKES YOU THINK THAT YOU ARE JUST KIDDING?
>well, because it is true.
SO YOU ARE TELLING ME THE REASON.
>yes, exactly.
YOU SOUND VERY OPTIMISTIC.
>thank you for the compliment!
DONT MENTION IT.
>ok.
PLEASE BE MORE SPECIFIC.
>i will try to be more specific next time.
DO YOU LIKE TALKING ABOUT YOURSELF?
>so, you think that i was talking about myself.
YOU ARE NOT REALLY TALKING ABOUT ME, ARE YOU?
>well, not really.
WHY ARE YOU SO UNCERTAIN?
```

ELIZA: Good Evening. Tell me your problems. Please terminate input with a period or a question mark.

PARRY: People get on my nerves sometimes.

ELIZA: I am not sure I understand you fully.

PARRY: You should pay more attention.

ELIZA: Suppose you should pay more attention.

PARRY: You're entitled to your own opinion.

ELIZA: What makes you think I am entitled to my own opinion?

PARRY: It bothers me just to be around people in general.

ELIZA: Please go on.

PARRY: I went to the track at Bay Meadows a while back.

ELIZA: What does that suggest to you?

PARRY: I went to the races.

ELIZA: Would you like to discuss your nerves?

PARRY: I guess so.

ELIZA: What does that suggest to you?

PARRY: What are you getting at?

ELIZA: What answer would please you most?

PARRY: It's not a matter of like or dislike.

ELIZA: What else would you like to discuss?

PARRY: I am getting tired of answering the same questions over and over.

ELIZA: What resemblance do you see?

PARRY: Why do you need to know that?

ELIZA: What do you think?

PARRY: I don't understand your motives.

ELIZA: Why don't you understand my motives?

Why we are here www.botathon.ai



BOTATHON 1.0

```
hello@botathon.ai:~$ cat botathon.txt
```

Hi, I'm Botathon.ai.

I am a hackathon, for bots! I know, crazy right?

It is September 10 - 11th. You should join us. To pre-register and be the first to get updates:

Text `Hi` to `(310) 905-8452`

See you soon!

Agenda

- Hello World
 - Setup and Install
 - BotBuilder
 - Connectors & Channels
- Conversation Flow
 - Prompts and Actions
- Determining Intent
 - Beyond Regex (LUIS)
- Publishing
 - Ngrok or Localtunnel
 - Webchat & Skype
 - Emulating and testing



Technology Needed today Node

■ Installs

- Node.js (and npm)
- Ngrok
- GIT (not necessary but helpful)
- VS Code

■ Signups needed

- MSID
- BotFramework.com
- LUIS – Language Understanding Intelligent Services









Workshop Flow

- All Levels of learning
- All speeds
- Mostly node.js (have help with C#)

* First pass through HOL 😊

Content

<https://bitbucket.org/DanielEgan/botworkshopnode>

 .git	8/23/2016 1:02 PM	File folder	
 completedHOLs	8/23/2016 12:00 PM	File folder	
 node_modules	8/14/2016 11:55 A...	File folder	
 samples	8/23/2016 12:00 PM	File folder	
 .gitignore	5/25/2016 4:49 PM	Text Document	1 KB
 bot4.pptx	8/23/2016 12:29 PM	Microsoft PowerPo...	10,712 KB
 BotFrameworkNodeHOL.docx	8/23/2016 1:02 PM	Microsoft Word D...	3,264 KB
 BotFrameworkNodeHOL.pdf	8/23/2016 12:00 PM	Adobe Acrobat D...	3,022 KB
 README.md	8/23/2016 12:00 PM	MD File	1 KB
 SNIPS.txt	8/23/2016 12:00 PM	Text Document	14 KB

← Hands On Labs Document (WORD)

← Hands On Labs Document (PDF)

← Code snippets for use with PDF

Content

<https://bitbucket.org/DanielEgan/botworkshopnode>

The screenshot shows the Bitbucket web interface for the repository `DanielEgan / BotWorkshopNode`. The browser's address bar displays the URL `https://bitbucket.org/DanielEgan/botworkshopnode/downloads`. The left sidebar contains navigation links under 'ACTIONS' (Clone, Create branch, Create pull request, Compare, Fork) and 'NAVIGATION' (Overview, Source, Commits, Branches, Pull requests, Downloads, Settings). The 'Downloads' link is highlighted. The main content area shows the 'Downloads' section with a large blue arrow icon and a 'Choose files to upload' button. Below this is a table with the following data:

Name	Size	Uploaded
Download repository	45.3 MB	

Three red arrows point to the URL in the address bar, the 'Downloads' link in the sidebar, and the 'Download repository' entry in the table.

Conventions Used

To create the folder, type the following t

```
~$ mkdir botworkshop
```

Don't type the ~\$



-----SNIP1-----

```
//Talking with the user.. as simple as poss  
var builder = require('botbuilder');  
  
var connector = new builder.ConsoleConnecto  
var bot = new builder.UniversalBot(connecto
```

If you are using the PDF
copy and paste from the
txt file NOT the PDF



SNIPS.txt - Notepad

File Edit Format View Help

-----SNIP1-----

```
//Talking with the user.. as simple as possible  
var builder = require('botbuilder');  
  
var connector = new builder.ConsoleConnector().listen();  
var bot = new builder.UniversalBot(connector);
```


Hello World

Your Bot Framework Bot



Bot Builder

Tools and services to build great bots that converse wherever your users are.

- Open source SDK on Github for Node.js, .NET and REST
- From simple built-in prompts and command dialogs to simple to use yet sophisticated 'FormFlow' dialogs
- Support for rich attachments (image, card, video, doc, etc.); support for calling (Skype)
- Online/offline chat Emulator
- Add bot smarts with Cognitive Services for language understanding and more



Developer Portal

Connect your bots to text/sms, Skype, Slack, Facebook Messenger, Office 365 mail and other channels.

- Register, connect, publish and manage your bot through your bot's dashboard
- Automatic card normalization across channels
- Skype channel auto-configured
- Embeddable Web chat control
- Host your bot in your app via the Direct Line API
- Fast, scalable message routing
- Diagnostic tools



Bot Directory

Try, use, and add published bots to the world's top conversation experiences.

- Public directory of bots registered and published with Microsoft Bot Framework
- Users can try your bot from the directory via the Web chat control
- Users can discover and add your bot to the channels on which it is configured when the Directory is made public to end users



Universal Bot

- The Brains of your bot.
- Manages your bots conversations with users across multiple channels

Methods		
▶ beginDialog	▶ endConversation	▶ on
▶ beginDialog Action	▶ get	▶ receive
▶ connector	▶ isInConversation	▶ send
▶ dialog	▶ library	▶ set
		▶ use

Chat & Console Connector

- Connects a UniversalBot to multiple channels via the Bot Framework.

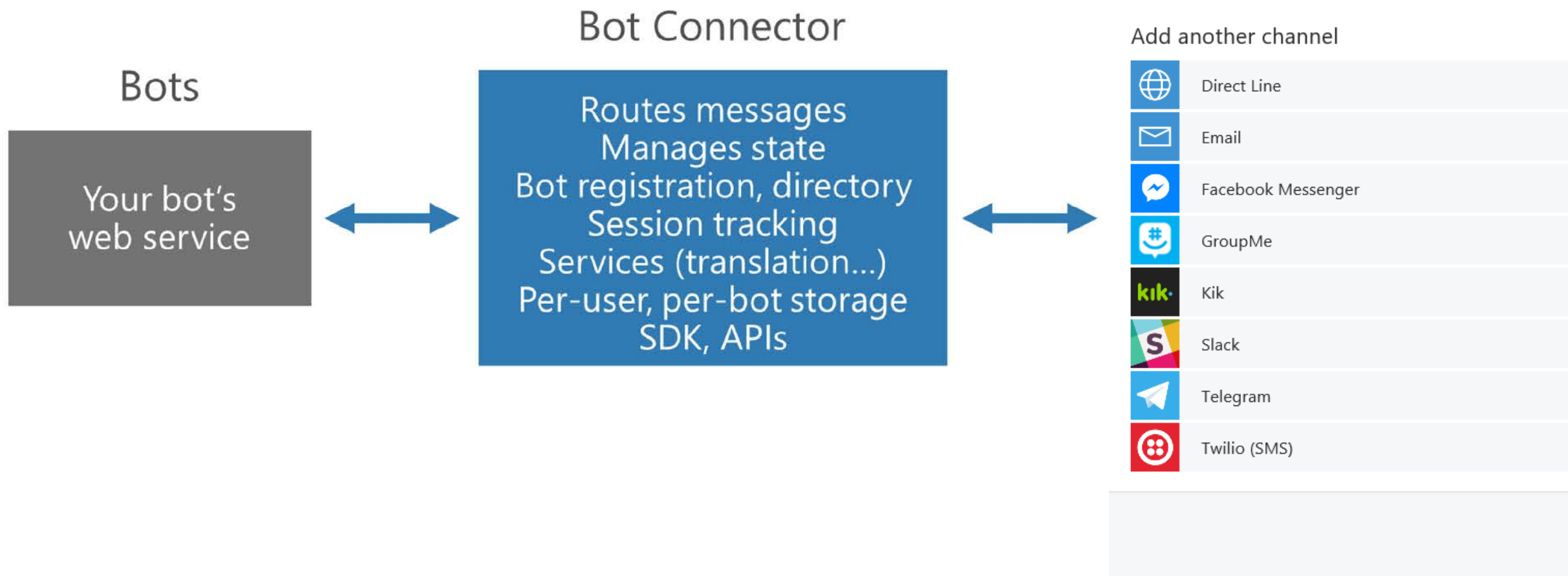
Methods		
▶ getData	▶ onEvent	▶ send
▶ listen	▶ saveData	▶ startConversation

ConsoleConnector

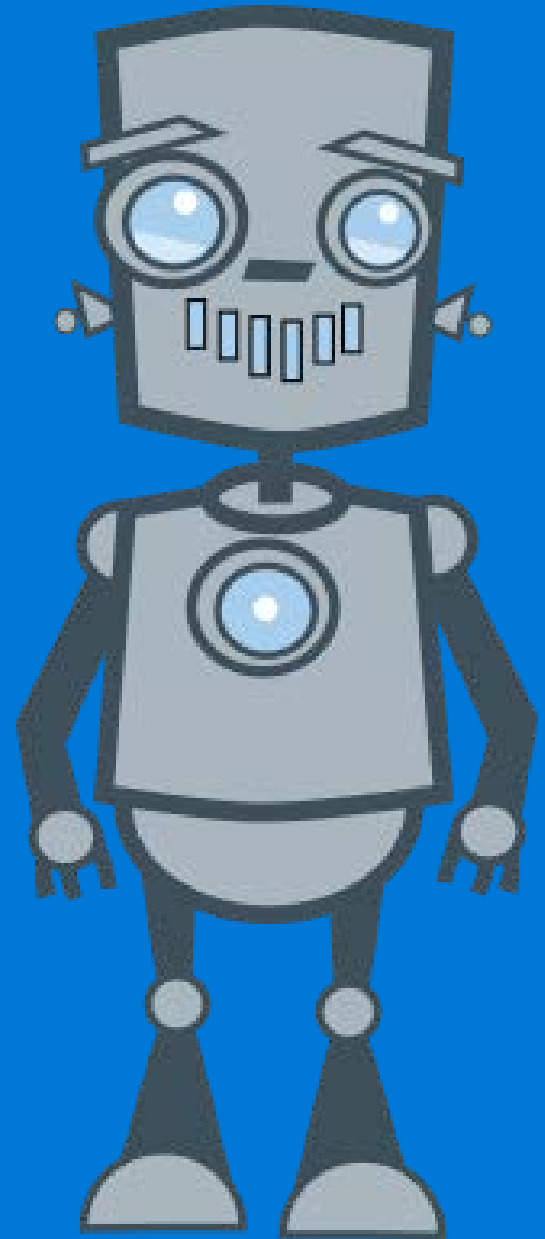
- ▶ [listen](#)
- ▶ [onEvent](#)
- ▶ [processMessage](#)
- ▶ [send](#)
- ▶ [startConversation](#)

ChatConnector

- ▶ [constructor](#)
- ▶ [getData](#)
- ▶ [listen](#)
- ▶ [onEvent](#)
- ▶ [saveData](#)
- ▶ [send](#)
- ▶ [startConversation](#)

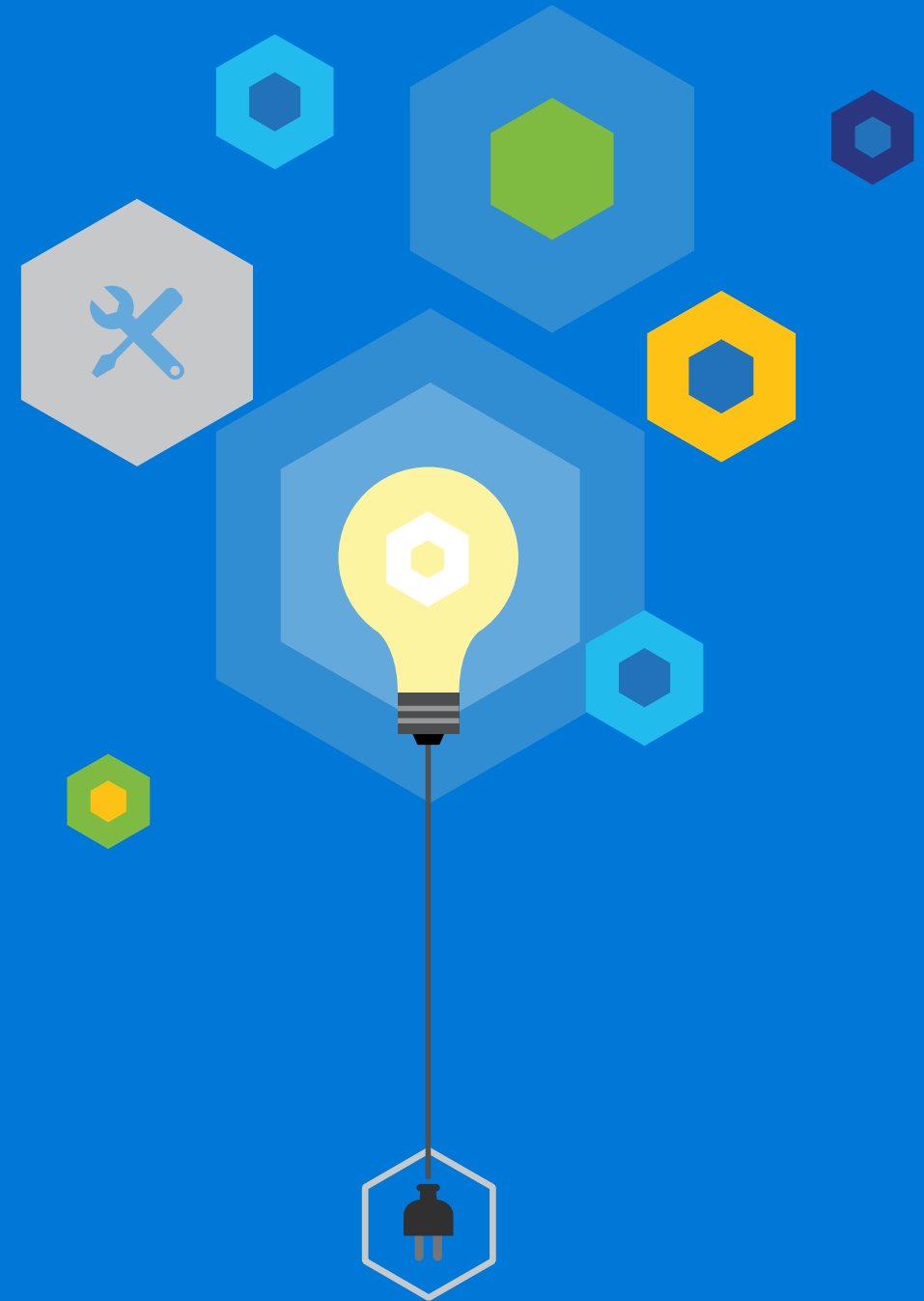


Demo: SimpleBot



HOL Exercise One

Installs, signups & node oh my.



Conversation Flow

Dialogs = Routing

Incoming Request

Parse URL

Find Matching Route

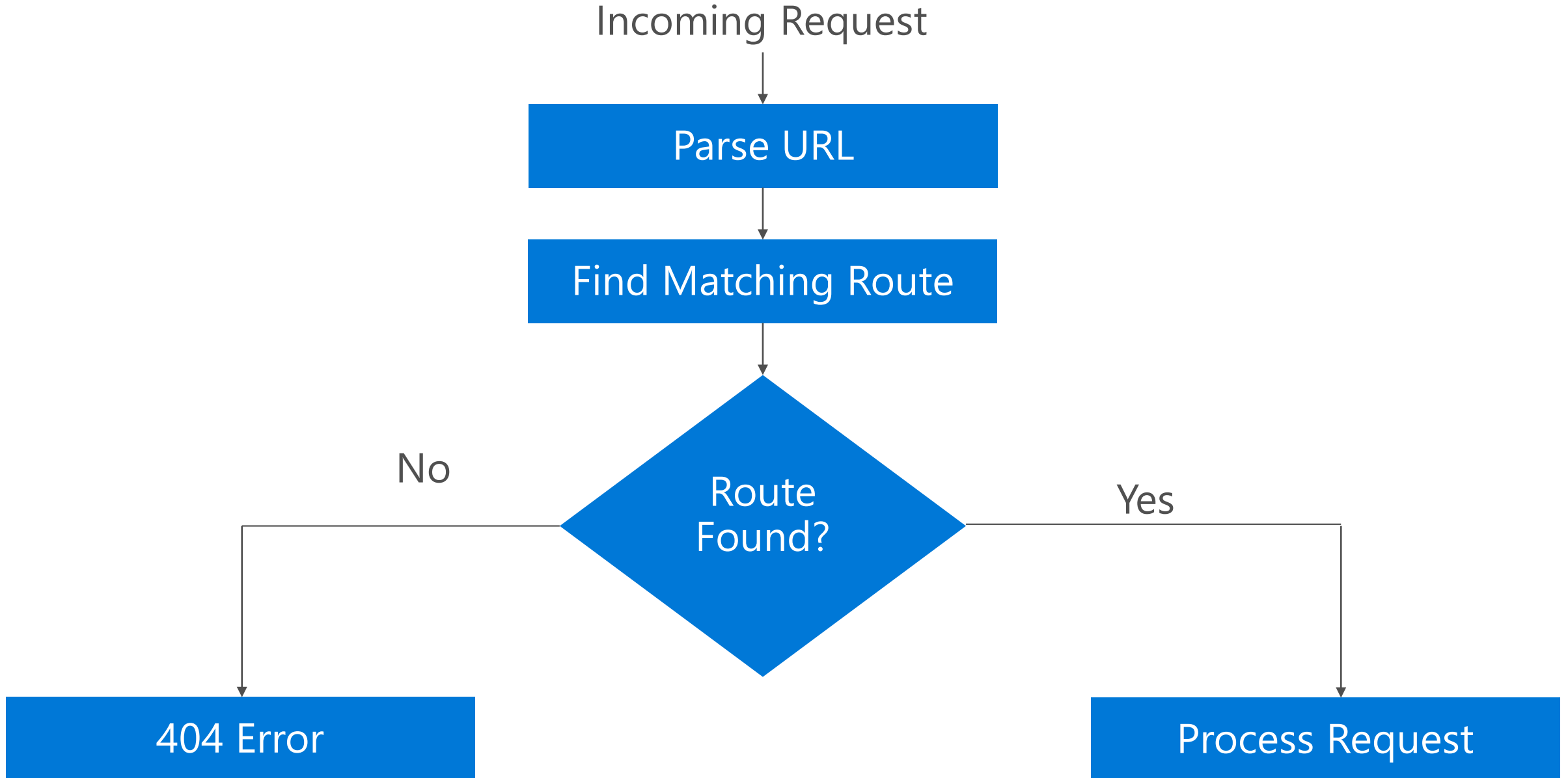
Route
Found?

No

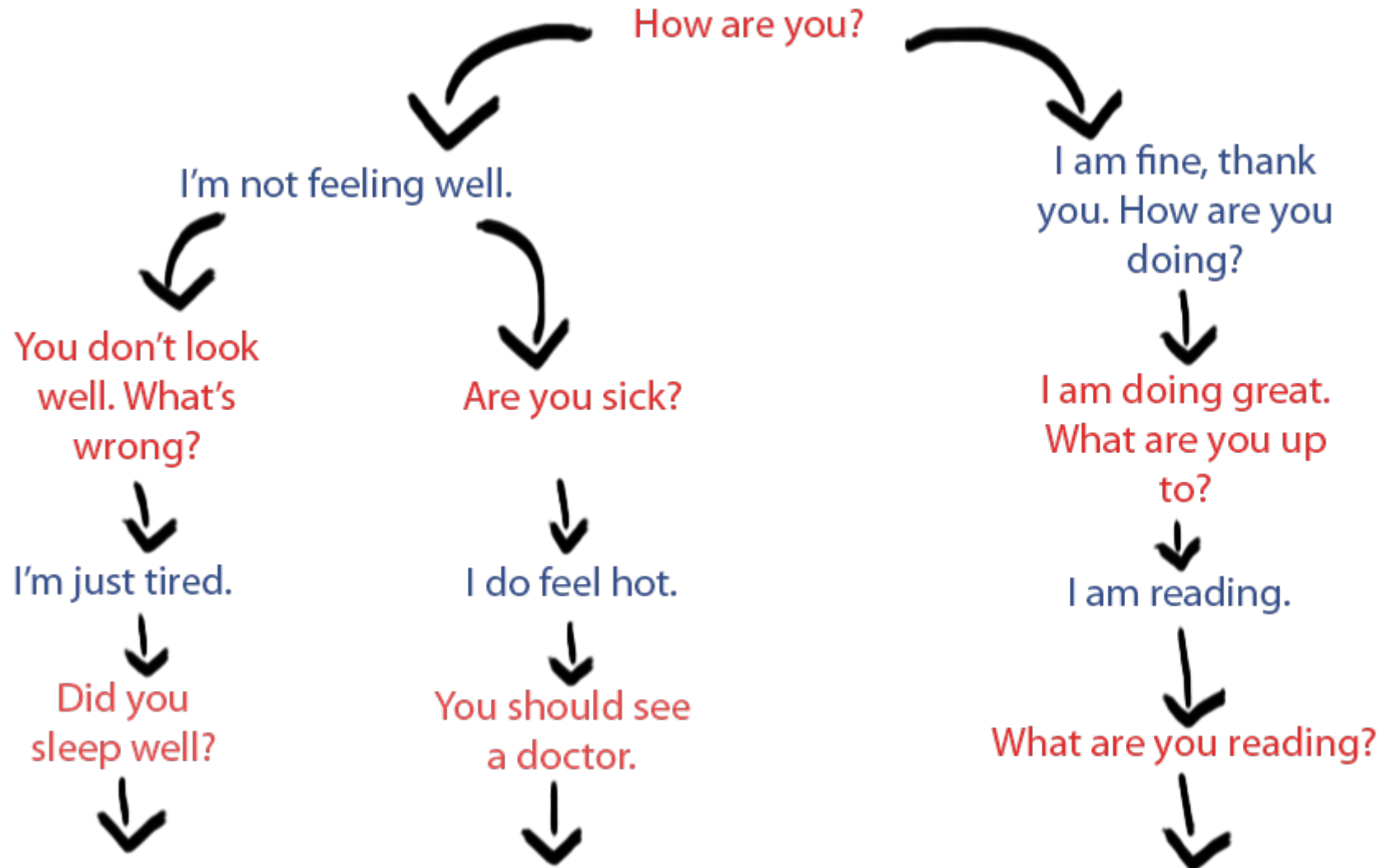
Yes

404 Error

Process Request



Dialogs = Routing



Dialogs = Routing

All bots will have at least one **root '/'** dialog

- Dialog Handlers
 - Waterfall
 - Dialog Object

Waterfall

Exactly what it sounds like...

```
bot.dialog('/', [  
  function (session) {  
    builder.Prompts.text(session, 'Hi! What is your name?');  
  },  
  function (session, results) {  
    session.send('Hello %s!', results.response);  
  }  
]);
```


Waterfall

Exactly what it sounds like...

```
bot.dialog('/', [  
    function (session) {  
        session.beginDialog('/askName');  
    },  
    function (session, results) {  
        session.send('Hello %s!', results.response);  
    }  
]);  
bot.dialog('/askName', [  
    function (session) {  
        builder.Prompts.text(session, 'Hi! What is your name?');  
    },  
    function (session, results) {  
        session.endDialogWithResult(results);  
    }  
]);
```

Dialog Object

```
bot.dialog('/', new builder.IntentDialog()
    .matches(/^hello/i, function (session) {
        session.send("Hi there!");
    })
    .onDefault(function (session) {
        session.send("I didn't understand. Say hello to me!");
    }));
```

Prompt types

Prompts.text()

Prompts.confirm()

Prompts.number()

Prompts.time()

Prompts.choice()

Prompts.attachment()

Dialog Actions

DialogAction.send

DialogAction.beginDialog

DialogAction.endDialog

DialogAction.validatedDialog

<https://docs.botframework.com/en-us/node/builder/chat/prompts/>

https://docs.botframework.com/en-us/node/builder/chat-reference/classes/_botbuilder_d_dialogaction.html#validatedprompt

Simple Waterfall

```
var builder = require('botbuilder');
```

```
var connector = new builder.ConsoleConnector().listen();  
var bot = new builder.UniversalBot(connector);
```

```
bot.dialog('/', [  
  function (session) {  
    builder.Prompts.text(session, 'Hi! What is your name?');  
  },  
  function (session, results) {  
    session.send('Hello %s!', results.response);  
  }  
]);
```



Our root dialog '/'
Uses a text prompt to collect name
and put in session.



we use the result of the prompt
to echo back to user (notice that it
is an array of functions in the
dialog)

First Run

```
var builder = require('botbuilder');
```

```
var connector = new builder.ConsoleConnector().listen();
```

```
var bot = new builder.UniversalBot(connector);
```

```
bot.dialog('/', [
```

```
    function (session, args, next) {
```

```
        if (!session.userData.name) {
```

```
            session.beginDialog('/profile');
```

```
        } else {
```

```
            next();
```

```
        }
```

```
    },
```

```
    function (session, results) {
```

```
        session.send('Hello %s!', session.userData.name);
```

```
    }
```

```
]);
```

← Nothing new here

← Our root dialog '/'
Checks **session.userData**
if no username sends to
our '/profile' dialog using
beginDialog()

```
bot.dialog('/profile', [
```

```
    function (session) {
```

```
        builder.Prompts.text(session, 'Hi! What is your name?');
```

```
    },
```

```
    function (session, results) {
```

```
        session.userData.name = results.response;
```

```
        session.endDialog();
```

```
    }
```

```
]);
```

← We use a text prompt to collect
name

← once data is collected we call
endDialog()

First Run

```
var builder = require('botbuilder');
```

```
var connector = new builder.ConsoleConnector().listen();
```

```
var bot = new builder.UniversalBot(connector);
```

```
bot.dialog('/', [
```

```
    function (session, args, next) {
```

```
        if (!session.userData.name) {
```

```
            session.beginDialog('/profile');
```

```
        } else {
```

```
            next();
```

```
        }
```

```
    },
```

```
    function (session, results) {
```

```
        session.send('Hello %s!', session.userData.name);
```

```
    }
```

```
]);
```



Our code flow returns here and proceeds to the next function



We then address user by name

```
bot.dialog('/profile', [
```

```
    function (session) {
```

```
        builder.Prompts.text(session, 'Hi! What is your name?');
```

```
    },
```

```
    function (session, results) {
```

```
        session.userData.name = results.response;
```

```
        session.endDialog();
```

```
    }
```

```
]);
```



This whole dialog is not used next time through

NEW First Run

```
var builder = require('botbuilder');
```

```
var connector = new builder.ConsoleConnector().listen();
```

```
var bot = new builder.UniversalBot(connector);
```

```
bot.dialog('/', function (session) {
```

```
    session.send("%s, I heard: %s", session.userData.name, session.message.text);
```

```
    session.send("Say something else...");
```

```
});
```

```
// Install First Run middleware and dialog
```

```
bot.use(builder.Middleware.firstRun({ version: 1.0, dialogId: '*/firstRun' }));
```

First Run Middleware



```
bot.dialog('/firstRun', [
```

```
    function (session) {
```

```
        builder.Prompts.text(session, "Hello... What's your name?");
```

```
    },
```

```
    function (session, results) {
```

```
        // We'll save the users name and send them an initial greeting. All
```

```
        // future messages from the user will be routed to the root dialog.
```

```
        session.userData.name = results.response;
```

```
        session.endDialog("Hi %s, say something to me and I'll say it back to you.", session.userData.name);
```

```
    }
```

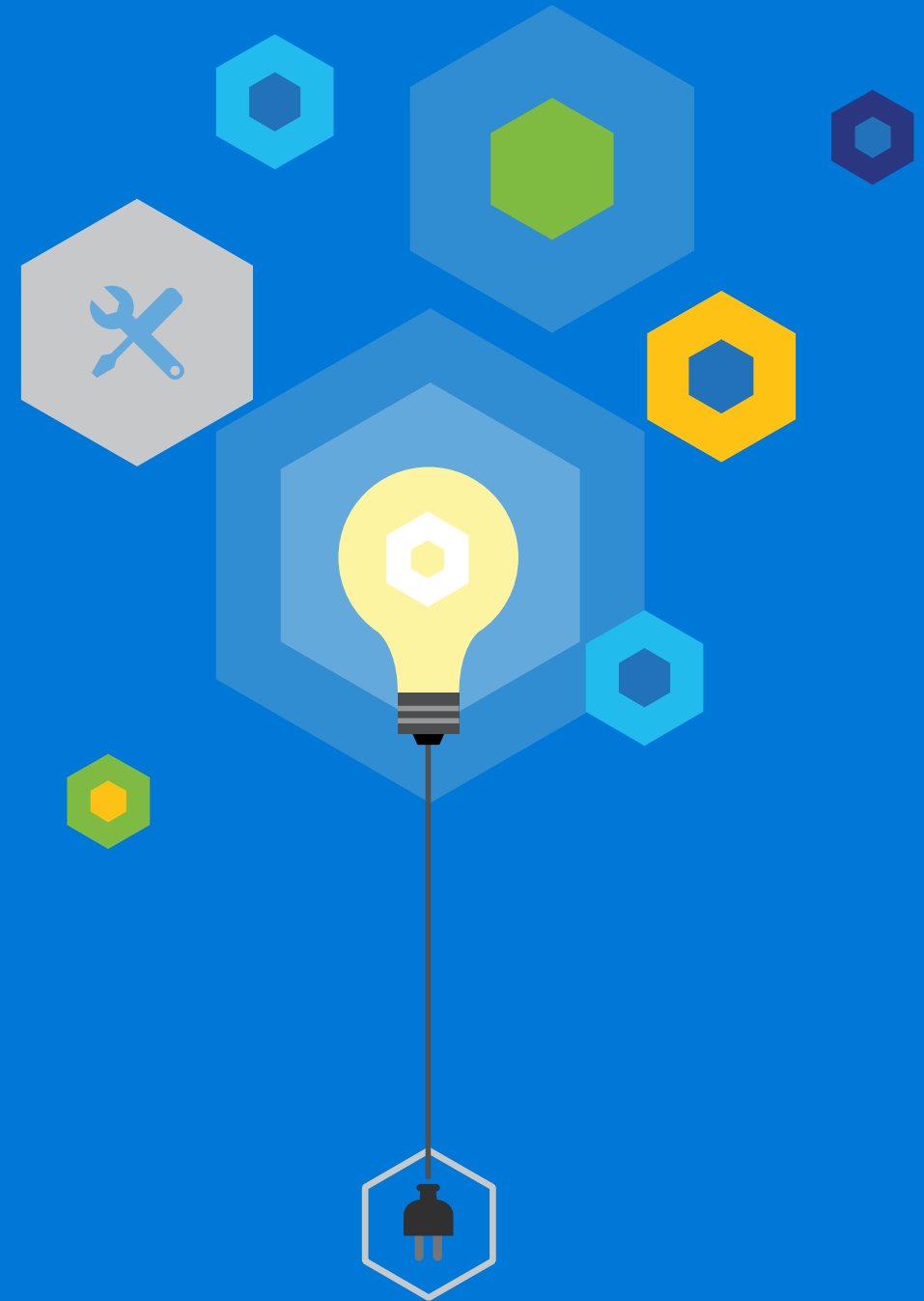
```
]);
```

Persisting Data

- `userData`
 - stores information globally for the user across all conversations.
- `conversationData`
 - stores information globally for a single conversation. This data is visible to everyone within the conversation so care should be used to what's stored there. It's disabled by default and needs to be enabled using the bots `persistConversationData` setting.
- `privateConversationData`
 - stores information globally for a single conversation but its private data for the current user. This data spans all dialogs so it's useful for storing temporary state that you want cleaned up when the conversation ends.
- `dialogData`
 - persists information for a single dialog instance. This is essential for storing temporary information in between the steps of a waterfall.

HOL Exercise TWO

Prompts & Dialogs



Determining Intent

What do you
mean?

Intent Dialogs

- Matching Regular Expressions
- Intent Recognizers
- Entity Recognition
- Using Luis

Matching Regular Expressions

New up an IntentDialog() and pass it to our dialog (instead of a function)

```
var intents = new builder.IntentDialog();  
bot.dialog('/', intents);  
  
intents.matches(/^echo/i, [  
    function (session) {  
        builder.Prompts.text(session, "What would you like me to say?");  
    },  
    function (session, results) {  
        session.send("Ok... %s", results.response);  
    }  
]);
```

If we match using a regex
If outside the bot dialog call
then we run that code.9 call
use intents.matches

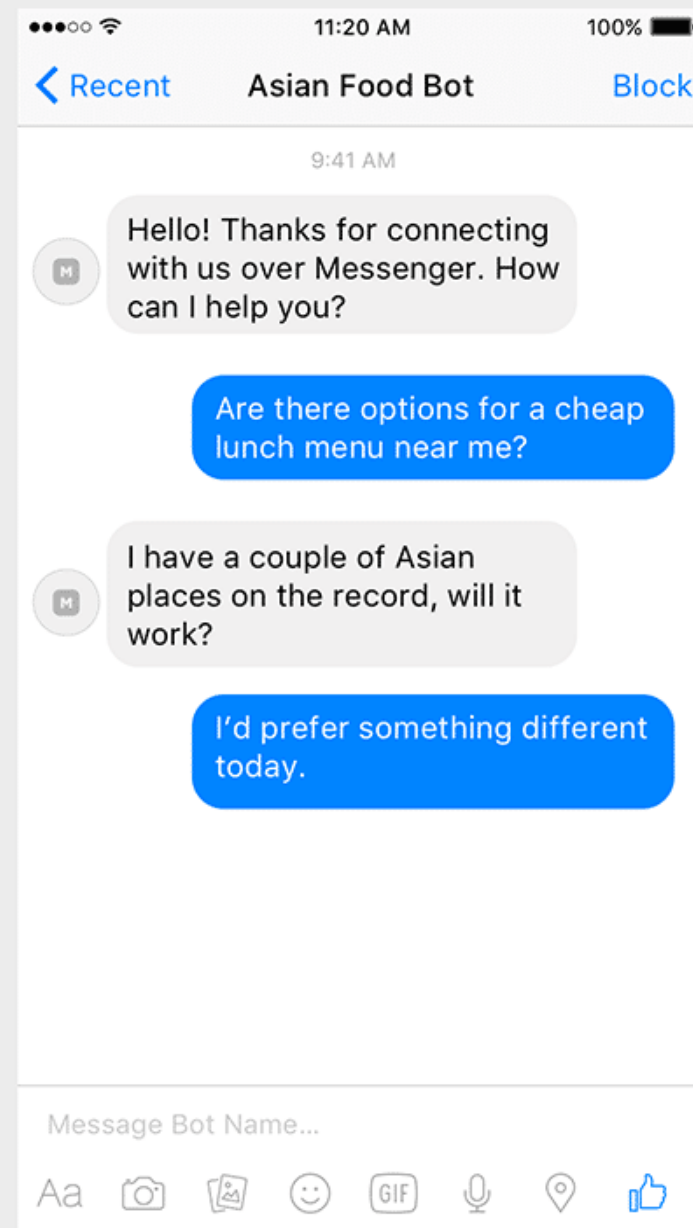
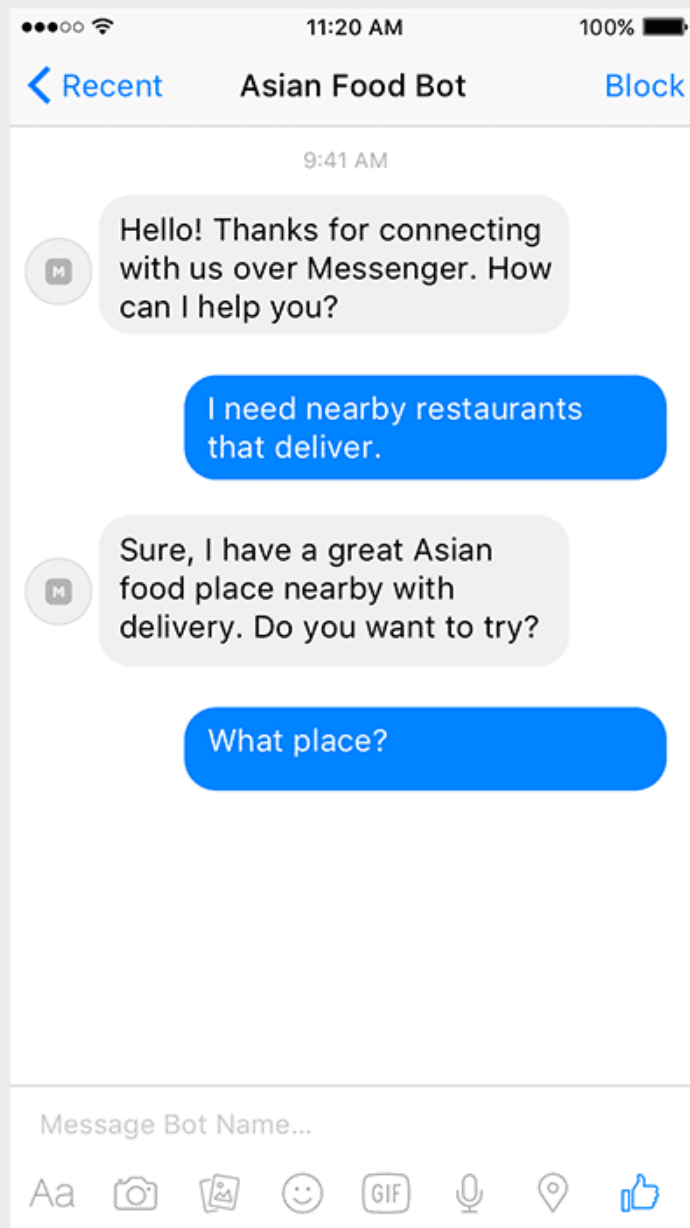
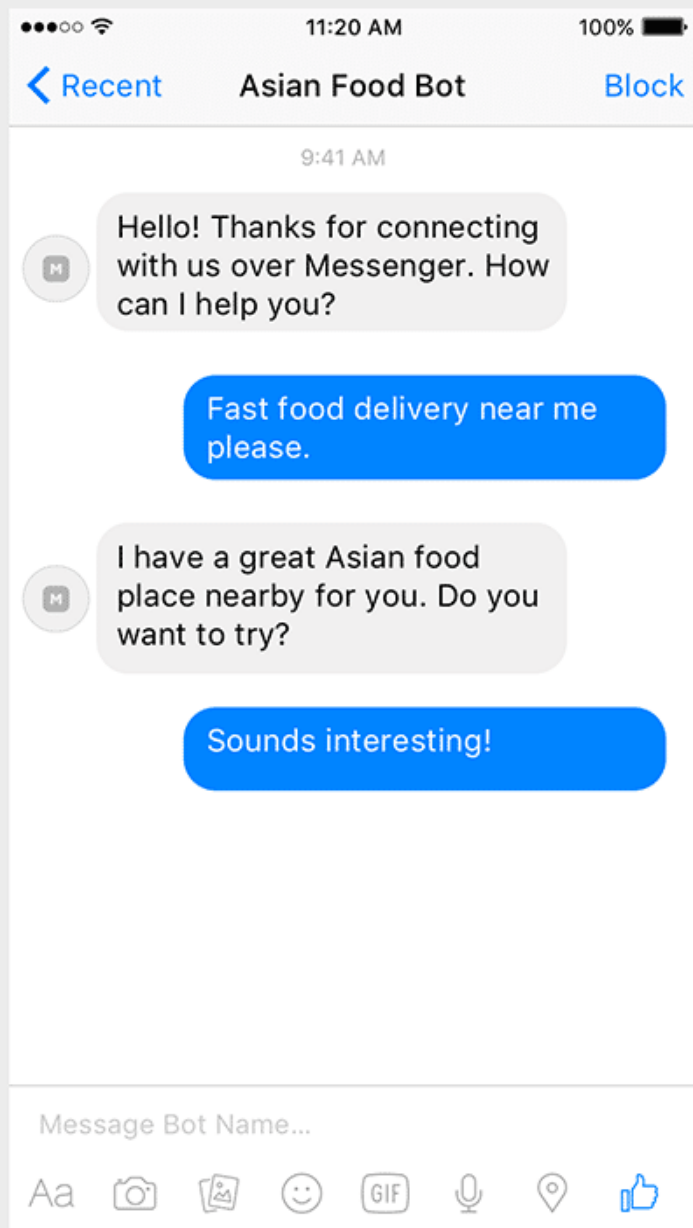
Matching Regular Expressions

```
bot.dialog('/', new builder.IntentDialog()
    .matches(/^add/i, '/addTask')
    .matches(/^change/i, '/changeTask')
    .matches(/^delete/i, '/deleteTask')
    .onDefault(builder.DialogAction.send("I'm sorry. I didn't understand."))
);
```



If inside the bot.dialog call we can easily stack dialog paths using dot (.) notation

Intent Recognizers

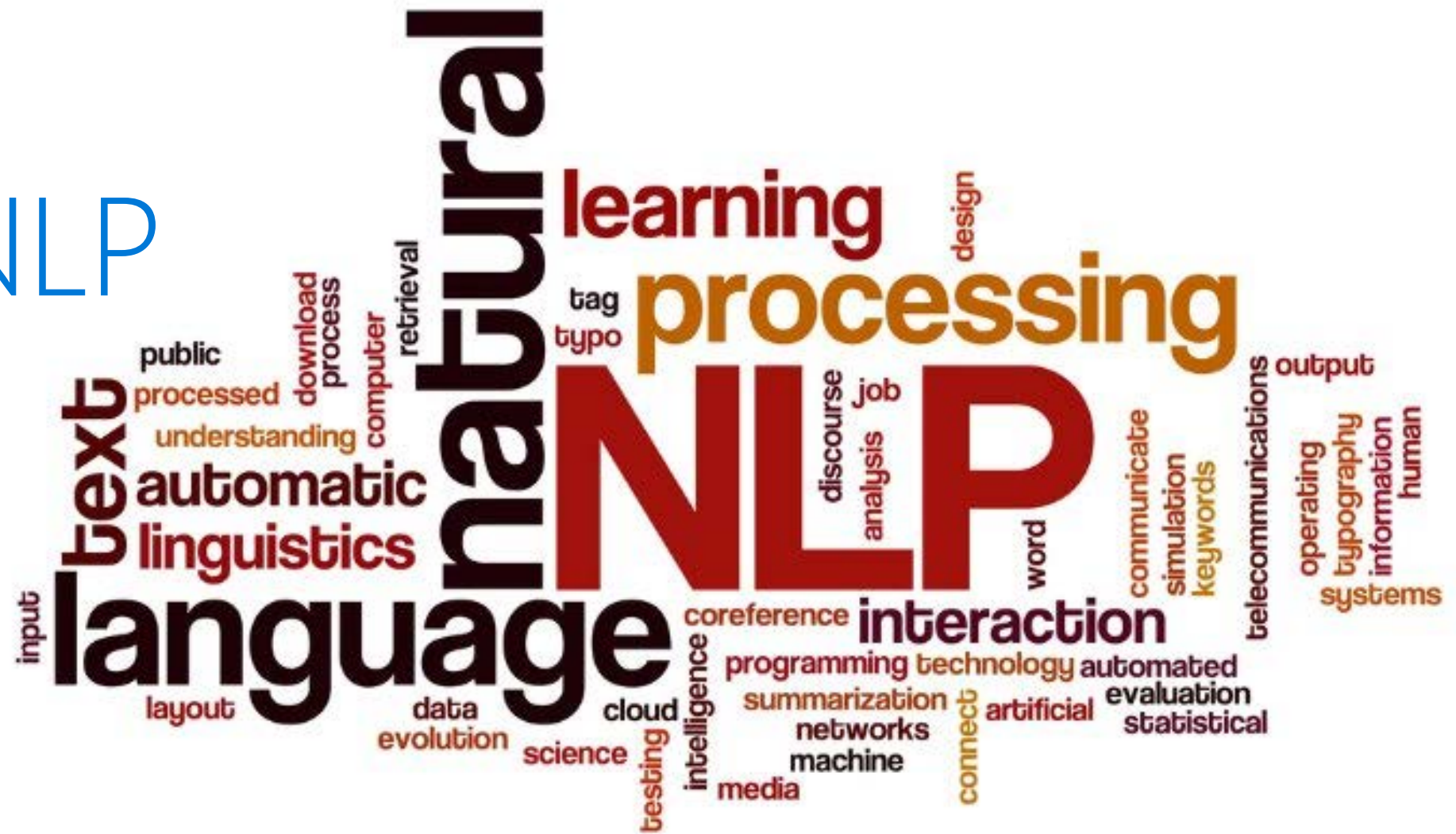


NLP not NLP

Neural Linguistic Programming

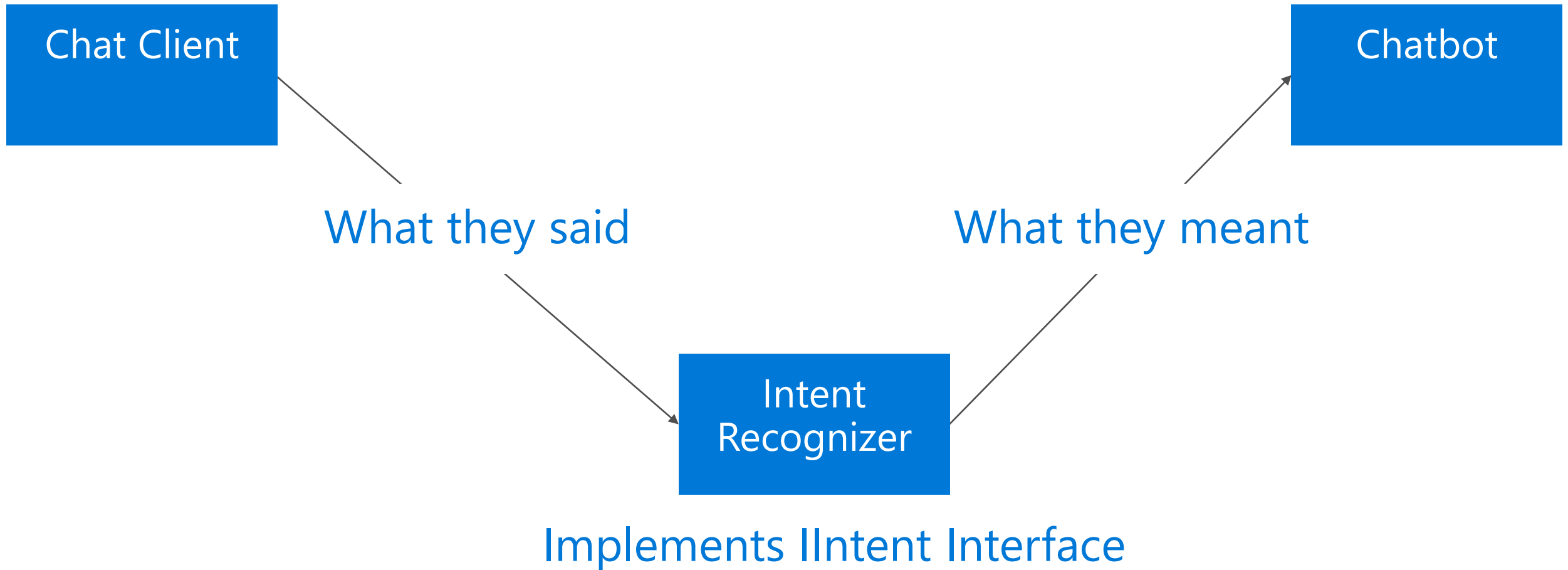


NLP not NLP



Natural Language Processing

Intent Recognizer Interface





LUIS

Language Understanding
Intelligent Service

Determine Intent

Detect Entities

Improve Models

Language Understanding Intelligent Service



Lets you understand what your users are saying

Seamless integration with Speech Recognition

A few examples are enough to deploy an application

LUIS learns over time

Define
Concepts

Provide
Examples

Deploy

Active Learning

LUIS: Edit Application

https://api.projectoaford...

https://www.luis.ai/application/79437ef7-2df0-4b39-aa1b-5dc7be34ef85

LUIS

My ApplicationsAboutHelpSupportForumJason WilliamsSign out

Exercise Tracker 2

New utterancesSearchSuggestReview labelsPerformance analysis

Intents

None

StartActivity

StopActivity

Entities

ActivityType

Pre-built Entities

No pre-built entities added

Model features

No model features added

finished with that jog

finished with that jog

Which entity is this?

ActivityType

Cancel

None

Submit

Label some utterances and click "train", and then I can predict likely errors for your intents and entities.

Train

Microsoft

LUIS: Edit Application

https://api.projectoaford

https://api.projectoaford

https://www.luis.ai/application/79437ef7-2df0-4b39-aa1b-5dc7be34ef85

LUIS

My ApplicationsAboutHelpSupportForumJason WilliamsSign out

Exercise Tracker 2

New utterancesSearchSuggestReview labelsPerformance analysis

Intents

StartActivity

StopActivity

None

SetHRTtarget

Entities

ActivityType

Pre-built Entities

No pre-built entities added

Model features

ActivityWords

set heart rate target to 145

Pre-built entities

Which Bing entity do you want to add?

geography

Continents, Countries, Cities, Post codes, and other points of interest
Antarctica, Portugal, Dubai, Sanjiang County, Lake Pontchartrain, CB3 0DS

encyclopedia

People, organizations, products, and hundreds of other types found in an encyclopedia
Acer Aspire, Harvard Business School, Jagiellonian Rowing Club, Steve Miller Band, Beijing Capital International Airport, Amsterdam Light Festival, Microsoft

percentage

A percentage, using the symbol % or the word "percent"
10%, 5.6 percent

datetime

Dates and times, resolved to a canonical form
June 23, 1976, Jul 11 2012, 7 AM, 6:49 PM, tomorrow at 7 AM

OK

Intents

StartActivity

StopActivity

None

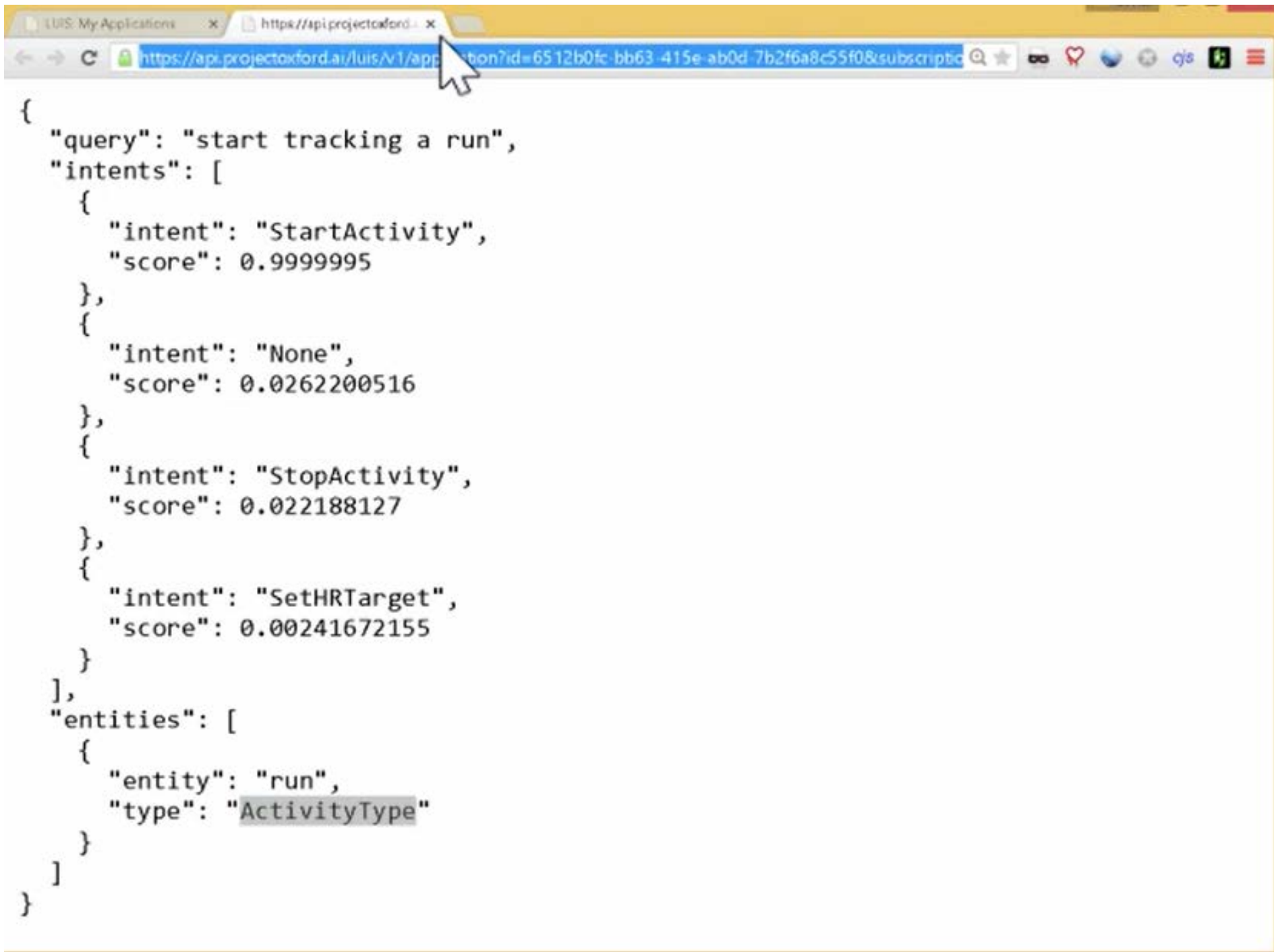
Correctly predicted

Error (predicted as other intent)

Train

Your application is up to date. Last train completed: 6/2/2015, 10:16:27 PM

Microsoft



```
{
  "query": "start tracking a run",
  "intents": [
    {
      "intent": "StartActivity",
      "score": 0.9999995
    },
    {
      "intent": "None",
      "score": 0.0262200516
    },
    {
      "intent": "StopActivity",
      "score": 0.022188127
    },
    {
      "intent": "SetHRTarget",
      "score": 0.00241672155
    }
  ],
  "entities": [
    {
      "entity": "run",
      "type": "ActivityType"
    }
  ]
}
```




Language Understanding Models



"News about
flight delays"

```
{
  "entities": [
    {
      "entity": "flight_delays",
      "type": "Topic"
    }
  ],
  "intents": [
    {
      "intent": "FindNews",
      "score": 0.99853384
    },
    {
      "intent": "None",
      "score": 0.07289317
    },
    {
      "intent": "ReadNews",
      "score": 0.0167122427
    },
    {
      "intent": "ShareNews",
      "score": 1.0919299E-06
    }
  ]
}
```

HOL Exercise Three & Four

Adding Skype and Using the Bot
Framework



More Information

- npm install BotFramework (Samples Directory)
- Hero Cards, Carousels, Images
- BotFramework Docs docs.botframework.com/