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Generate att/inte-ractive Forms dynamically in Terminal

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Motivation

- Survey not supported anymore!
  - *A Golang library for building interactive and accessible prompts with full support for windows and posix terminals (terminals supporting ANSI escape sequences)*
  - ⚠️ *This project is no longer maintained. For an alternative, please check out: https://github.com/charmbracelet/bubbletea* ⚠️
  - Since 2017, archived by the owner on Apr 19, 2024
  - 70+ releases
  - Used by 200
  - Contributors 69

TUI frameworks (1/2)

- termui - *Golang terminal dashboard:*
  - active 2016-2019
  - 5 releases
  - 49 contributors
  - 13k GH stars

- tui-go - *a UI library for terminal applications*:
  - repo archived by the owner on Oct 13, 2021
  - 4 releases
  - 24 contributors
  - 2.1k GH stars

TUI frameworks (2/2)

- go-prompt - *Building powerful interactive prompts in Go, inspired by python-prompt-toolkit:*
  - active 2017 - 2021
  - 9 releases
  - 23 contributors
  - 1.7k GH stars

- tview - *Terminal UI library with rich, interactive widgets — written in Go:*
  - active since 2017
  - 0 releases
  - 89 contributors
  - 10.2k GH stars
  - Used by many incl. GH (https://github.com/cli/cli)

The ELM architecture (1/4)

- https://guide.elm-lang.org/architecture/

- Elm is a functional language that compiles to JavaScript.
  It helps you make websites and web apps.
  It has a strong emphasis on simplicity and quality tooling.
  Functional programming language for building browser-based GUIs.

- Elm Playground (Online Editor): https://elm-lang.org/try

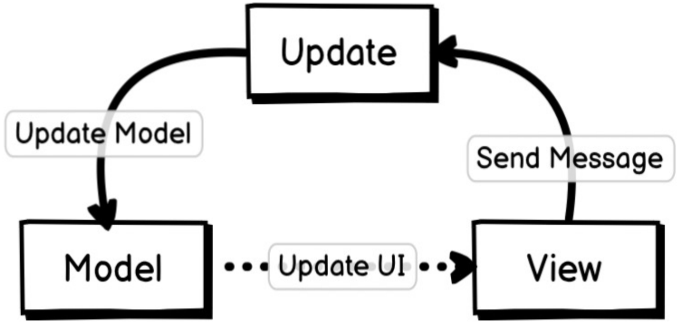
- The Elm Architecture is a pattern for architecting interactive programs, like webapps and games.

The ELM architecture (2/4)

- The basic pattern: “*The Elm program produces HTML to show on screen, and then the computer sends back messages of what is going on.*”

- The arch-pattern breaks into three parts (core concepts):

  - **Model** — the state of your application
  - **View** — the visual representation of the Model
  - **Update** — a way to update the Model based on messages

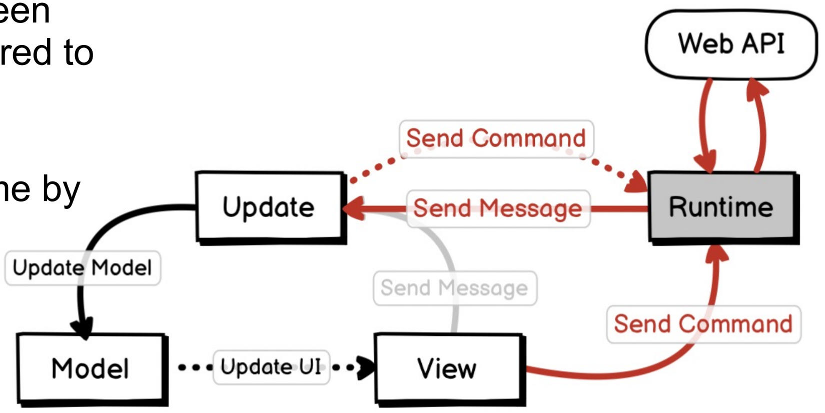


- Any user’s interaction on the View will trigger a **Message** that will be sent to the Update method, which will then modify the Model. Any changes to the Model will trigger updating the View.

The ELM architecture (3/4)

- Component that handles the comm. between app. and the external environment is referred to as the **Runtime**.

- Application communicates with the Runtime by sending **Commands**.

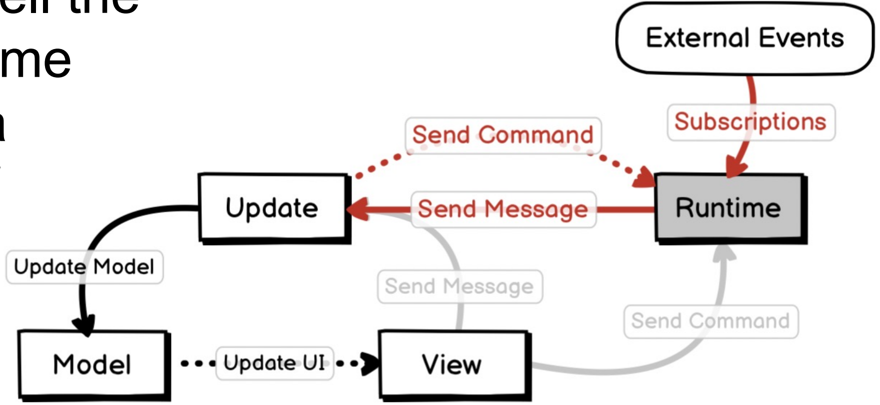


- When a Runtime receives a Command, it communicates with the external environment to get the work done and sends a Message back to the Update method of your application, so the UI can be updated with the result.

- If needed, the Update method can also send new Commands to the Runtime. The cycle continues.

The ELM architecture (4/4)

- Another important concept are **Subscriptions** - a way to tell the Runtime to subscribe to some external events and send a Message back to Update if needed.



- The rest of the flow is pretty much the same (in analogy to sending Commands).

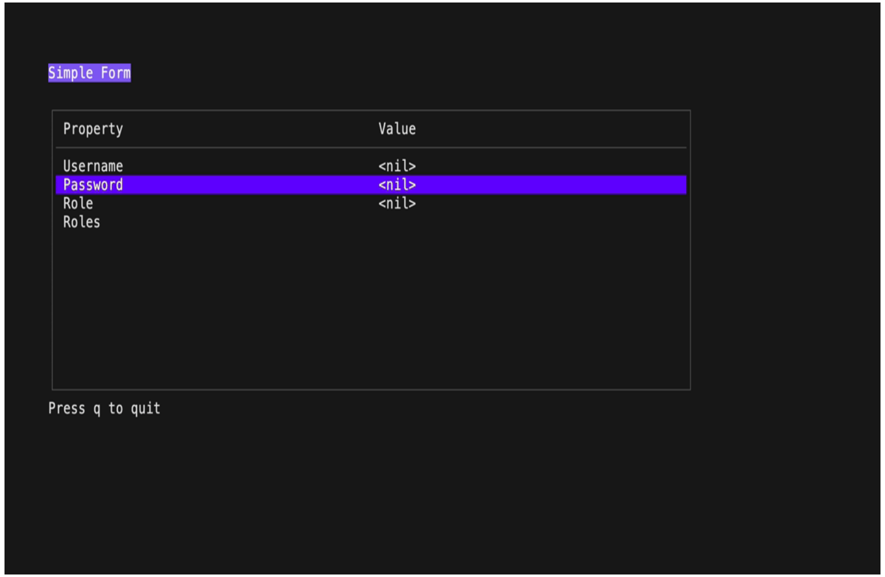
The *Bubbletea* Family (1/2) (*makes the command line glamorous*)

- bubbletea - *A powerful little TUI framework* 🏗
  - 36 releases
  - 25k GH stars
  - 7.4k users, also used in nearly 100 other GH repos
  - 124 contributors
- bubbles - *TUI components for Bubble Tea* 🫧
  - 24 releases
  - 5k GH stars
  - 6.2k users
  - 66 contributors
- Huh? - *Build terminal forms and prompts* 🤷🏻‍♀️ *(A simple, powerful library for building interactive forms and prompts in the terminal)*
  - 3.6k GH stars
  - 7 releases
  - 426 users
  - 27 contributors

The *Bubbletea* Family (2/2) (*makes the command line glamorous*)

- Bubble Tea programs are comprised of a model that describes the application state and three simple methods on that model:
  - **Init**, a function that returns an initial command for the application to run.
  - **Update**, a function that handles incoming events and updates the model accordingly.
  - **View**, a function that renders the UI based on the data in the model.

Terminalform – Building forms in terminal easily (from Devs to Devs)



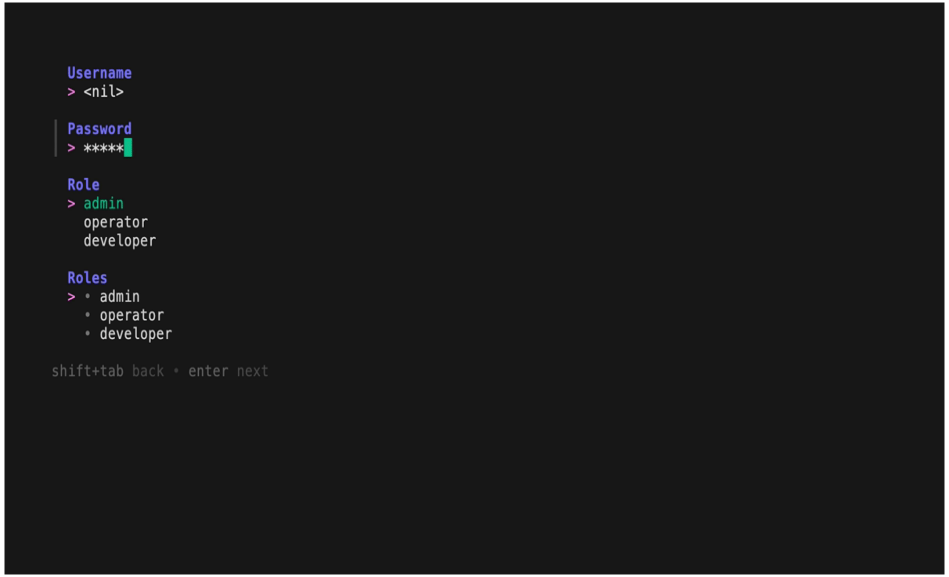
```
Simple Form

Property                                    Value

Username                                    <nil>
Password                                    <nil>
Role                                        <nil>
Roles

Press q to quit
```

Table view



```
Username
> <nil>

Password
> *****

Role
> admin
  operator
  developer

Roles
> • admin
  • operator
  • developer

shift+tab back • enter next
```

Form view

What *Terminalform* brings ?

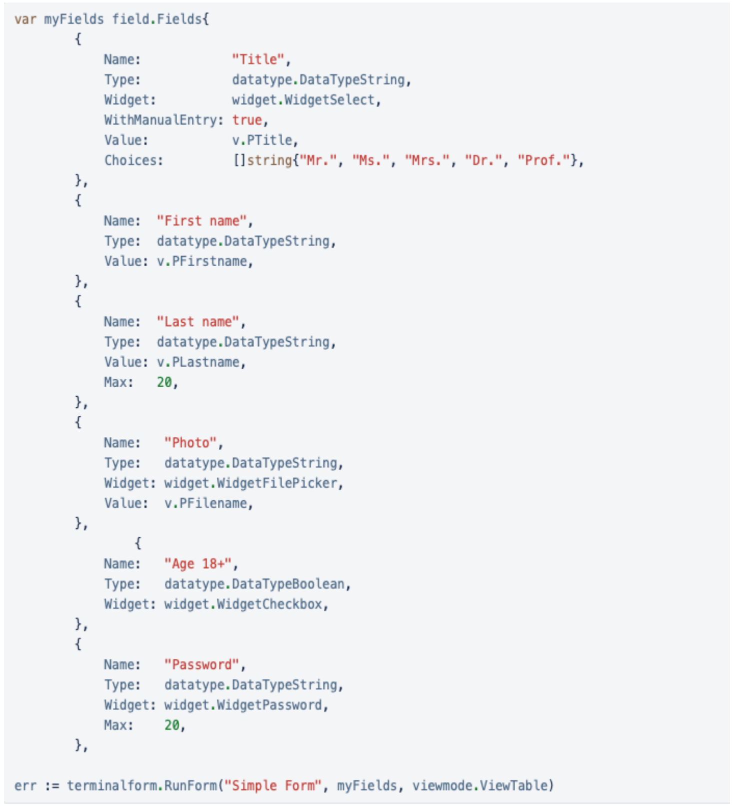
- Customizable widgets.

- You write Golang objects - you get terminal forms.

- Not in the mood to write Go code?
  No problem, just provide a proper YAML file (declarative approach).

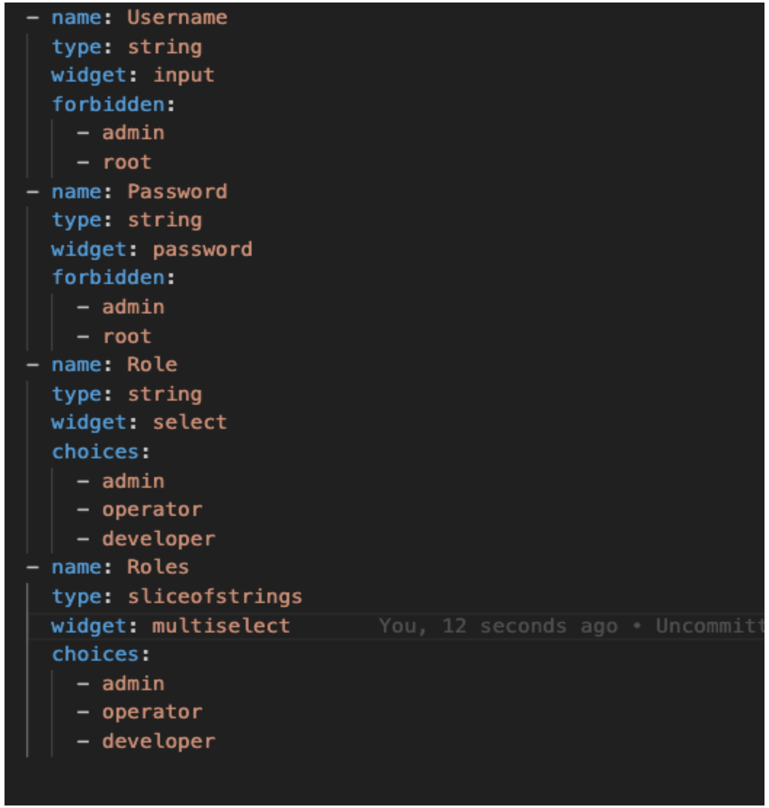
- Too lazy to write YAML files?
  No problem, just use *Straw* (form designer), to create *terminalform* specific YAML file.

Hands On? Well, barely !



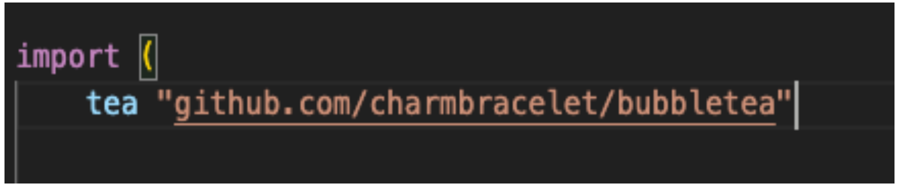
```go
var myFields field.Fields{
        {
            Name:           "Title",
            Type:           datatype.DataTypeString,
            Widget:         widget.WidgetSelect,
            WithManualEntry: true,
            Value:          v.PTitle,
            Choices:        []string{"Mr.", "Ms.", "Mrs.", "Dr.", "Prof."},
        },
        {
            Name:  "First name",
            Type:  datatype.DataTypeString,
            Value: v.PFirstname,
        },
        {
            Name:  "Last name",
            Type:  datatype.DataTypeString,
            Value: v.PLastname,
            Max:   20,
        },
        {
            Name:   "Photo",
            Type:   datatype.DataTypeString,
            Widget: widget.WidgetFilePicker,
            Value:  v.PFilename,
        },
                {
            Name:   "Age 18+",
            Type:   datatype.DataTypeBoolean,
            Widget: widget.WidgetCheckbox,
        },
        {
            Name:   "Password",
            Type:   datatype.DataTypeString,
            Widget: widget.WidgetPassword,
            Max:    20,
        },

err := terminalform.RunForm("Simple Form", myFields, viewmode.ViewTable)
```

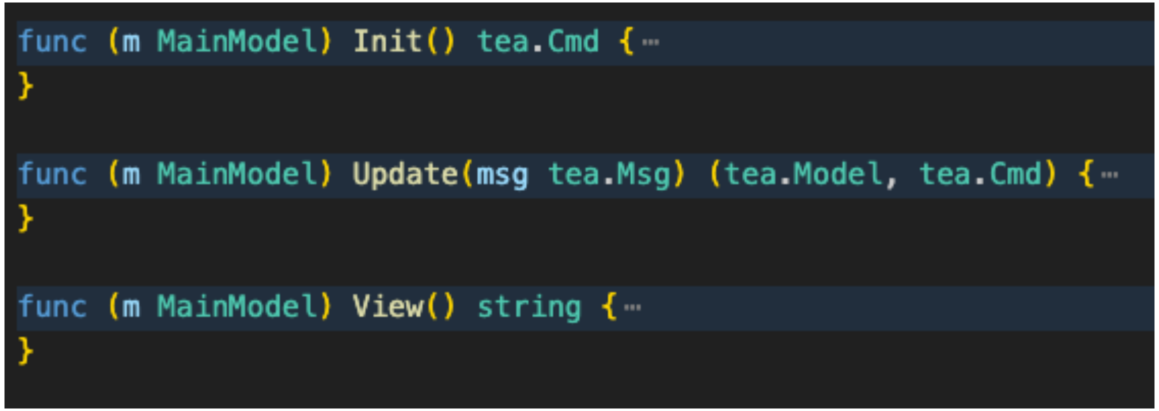


```yaml
- name: Username
  type: string
  widget: input
  forbidden:
    - admin
    - root
- name: Password
  type: string
  widget: password
  forbidden:
    - admin
    - root
- name: Role
  type: string
  widget: select
  choices:
    - admin
    - operator
    - developer
- name: Roles
  type: sliceofstrings
  widget: multiselect       You, 12 seconds ago • Uncommitt
  choices:
    - admin
    - operator
    - developer
```

Ultimately, what is a *widget* ?



```go
import (
    tea "github.com/charmbracelet/bubbletea"
```



```go
func (m MainModel) Init() tea.Cmd {…
}

func (m MainModel) Update(msg tea.Msg) (tea.Model, tea.Cmd) {…
}

func (m MainModel) View() string {…
}
```

Demo

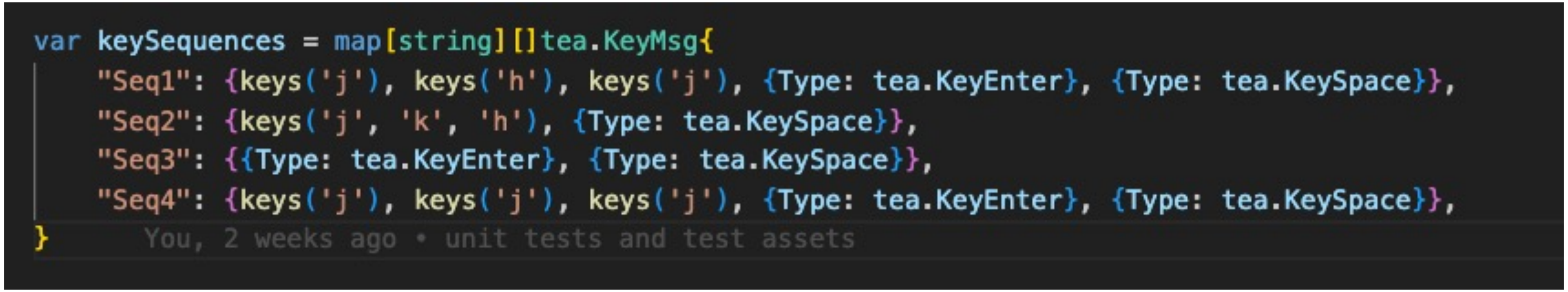
Challenges

- ➢Unit testing
- ➢Debugging

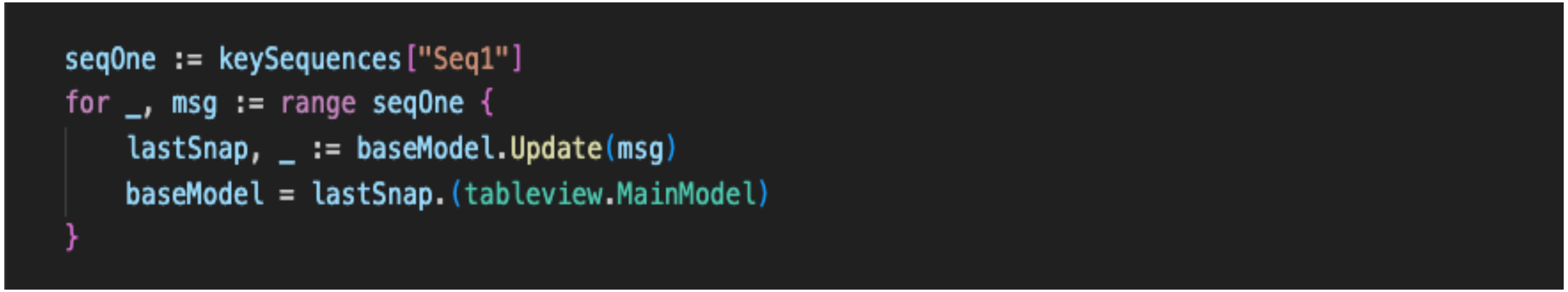
Unit Testing in Terminalform (1/2)

- Provide Keyboard as objects Keys to the model
- Generate View (ultimately, a string)
- Compare with the expected View in predefined asset

Unit Testing in Terminalform (2/2)



```go
var keySequences = map[string][]tea.KeyMsg{
    "Seq1": {keys('j'), keys('h'), keys('j'), {Type: tea.KeyEnter}, {Type: tea.KeySpace}},
    "Seq2": {keys('j', 'k', 'h'), {Type: tea.KeySpace}},
    "Seq3": {{Type: tea.KeyEnter}, {Type: tea.KeySpace}},
    "Seq4": {keys('j'), keys('j'), keys('j'), {Type: tea.KeyEnter}, {Type: tea.KeySpace}},
}        You, 2 weeks ago • unit tests and test assets
```



```go
seqOne := keySequences["Seq1"]
for _, msg := range seqOne {
    lastSnap, _ := baseModel.Update(msg)
    baseModel = lastSnap.(tableview.MainModel)
}
```

Debugging TUI apps TL;DR

-
  ```
  dlv debug \
   -headless \
   -api-version=2 \
   listen=127.0.0.1:{port_of_choice} .
  ```

- In another terminal, just run:
  ```
  dlv connect 127.0.0.1:{same_port}
  ```

- In VS Code, just attach to a running debug session (remotely).

- And last, but not least, ensure you deactivated mouse events.

Questions

- ➢Thank you for listening, any questions ?