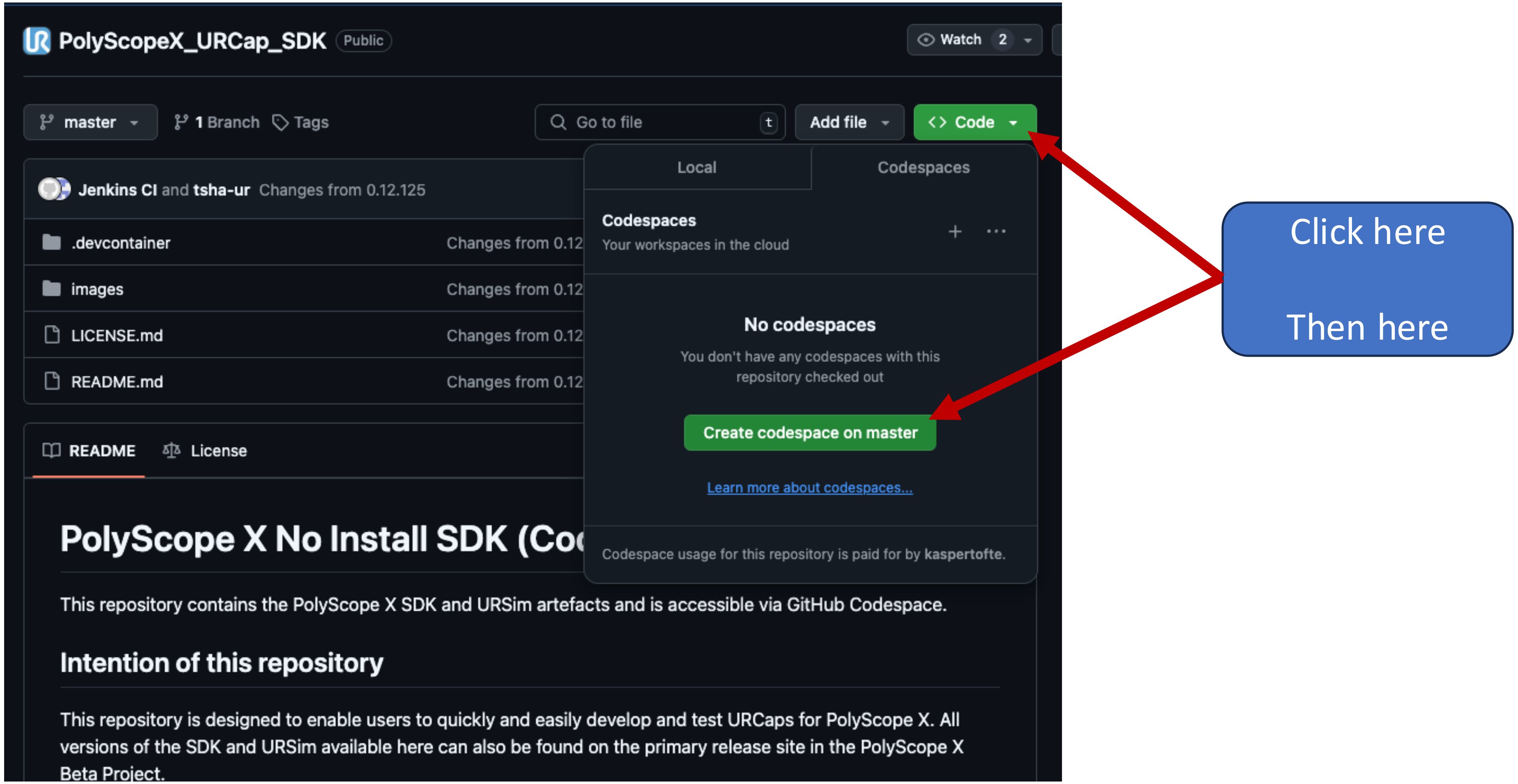
Polyscope X

Create an account on github

- Create and account and login on github.com
- github is a place where developers can share code
- Navigate to https://github.com/UniversalRobots/PolyScopeX_URCap_SDK

Kick off the SDK



Jenkins CI and tsha-ur Changes from 0.12.125

.devcontainer	Changes from 0.12
images	Changes from 0.12
LICENSE.md	Changes from 0.12
README.md	Changes from 0.12

Codespaces
Your workspaces in the cloud

No codespaces

You don't have any codespaces with this repository checked out

Codespace usage for this repository is paid for by **kaspertofte**.

PolyScope X No Install SDK (Co

This repository contains the PolyScope X SDK and URSim artefacts and is accessible via GitHub Codespace.

Intention of this repository

This repository is designed to enable users to quickly and easily develop and test URCaps for PolyScope X. All versions of the SDK and URSim available here can also be found on the primary release site in the PolyScope X Beta Project.

Click here

Then here

Kick off the simulator

- Go through the README.md:
    - In ‘TERMINAL’ type ‘./run-simulator’ and press enter
        - Wait until you see:

          ```
          runtime-1  | web-bootstrapper-1  | 2024/10/28 11:33:06 [      INFO] Done, time to sleep forever
          ```
    - Choose ‘PORTS’, click ‘Forward a Port’, add port ‘80’
    - Click the globus in the ‘Forwarded Address’ field (appears on mouse-over)

    - You should now have an instance of the Polyscope X simulator running

Polyscope X demo

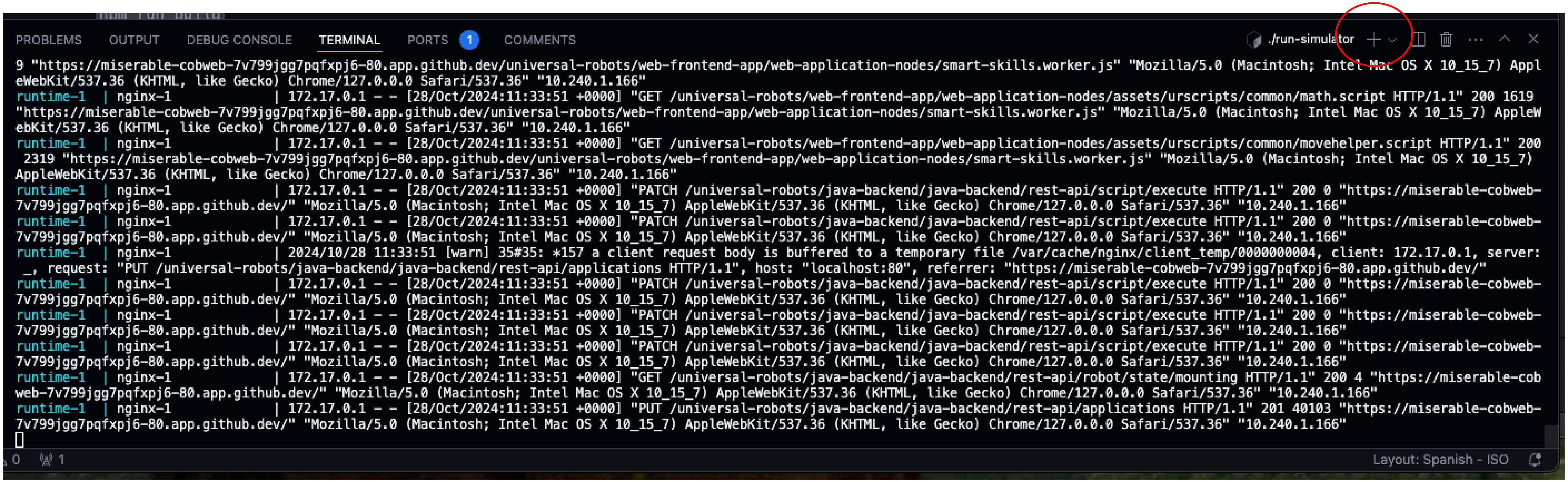
Documentation

- Documentation for SDK: https://docs.universal-robots.com/PolyScopeX_SDK_Documentation/build/PSX-SDK-v0.12/index.html
- UI library: https://psx-storybook.universal-robots.com/0.17.5/?path=/docs/welcome--docs
- Script manual: https://docs.universal-robots.com/PolyScopeX_SDK_Documentation/build/PSX-SDK-v0.12/_downloads/4dfc6a57b84e54a4c81b585d33472730/scriptManualG5.pdf

Make your own program node

Open a new terminal

- In the ‘TERMINAL’ tab hit the ‘+’



```
9 "https://miserable-cobweb-7v799jgg7pqfxpj6-80.app.github.dev/universal-robots/web-frontend-app/web-application-nodes/smart-skills.worker.js" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) Appl
eWebKit/537.36 (KHTML, like Gecko) Chrome/127.0.0.0 Safari/537.36" "10.240.1.166"
runtime-1  | nginx-1            | 172.17.0.1 - - [28/Oct/2024:11:33:51 +0000] "GET /universal-robots/web-frontend-app/web-application-nodes/assets/urscripts/common/math.script HTTP/1.1" 200 1619
"https://miserable-cobweb-7v799jgg7pqfxpj6-80.app.github.dev/universal-robots/web-frontend-app/web-application-nodes/smart-skills.worker.js" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleW
ebKit/537.36 (KHTML, like Gecko) Chrome/127.0.0.0 Safari/537.36" "10.240.1.166"
runtime-1  | nginx-1            | 172.17.0.1 - - [28/Oct/2024:11:33:51 +0000] "GET /universal-robots/web-frontend-app/web-application-nodes/assets/urscripts/common/movehelper.script HTTP/1.1" 200
 2319 "https://miserable-cobweb-7v799jgg7pqfxpj6-80.app.github.dev/universal-robots/web-frontend-app/web-application-nodes/smart-skills.worker.js" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7)
AppleWebKit/537.36 (KHTML, like Gecko) Chrome/127.0.0.0 Safari/537.36" "10.240.1.166"
runtime-1  | nginx-1            | 172.17.0.1 - - [28/Oct/2024:11:33:51 +0000] "PATCH /universal-robots/java-backend/java-backend/rest-api/script/execute HTTP/1.1" 200 0 "https://miserable-cobweb-
7v799jgg7pqfxpj6-80.app.github.dev/" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/127.0.0.0 Safari/537.36" "10.240.1.166"
runtime-1  | nginx-1            | 172.17.0.1 - - [28/Oct/2024:11:33:51 +0000] "PATCH /universal-robots/java-backend/java-backend/rest-api/script/execute HTTP/1.1" 200 0 "https://miserable-cobweb-
7v799jgg7pqfxpj6-80.app.github.dev/" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/127.0.0.0 Safari/537.36" "10.240.1.166"
runtime-1  | nginx-1            | 2024/10/28 11:33:51 [warn] 35#35: *157 a client request body is buffered to a temporary file /var/cache/nginx/client_temp/0000000004, client: 172.17.0.1, server:
 _, request: "PUT /universal-robots/java-backend/java-backend/rest-api/applications HTTP/1.1", host: "localhost:80", referrer: "https://miserable-cobweb-7v799jgg7pqfxpj6-80.app.github.dev/"
runtime-1  | nginx-1            | 172.17.0.1 - - [28/Oct/2024:11:33:51 +0000] "PATCH /universal-robots/java-backend/java-backend/rest-api/script/execute HTTP/1.1" 200 0 "https://miserable-cobweb-
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runtime-1  | nginx-1            | 172.17.0.1 - - [28/Oct/2024:11:33:51 +0000] "GET /universal-robots/java-backend/java-backend/rest-api/robot/state/mounting HTTP/1.1" 200 4 "https://miserable-cob
web-7v799jgg7pqfxpj6-80.app.github.dev/" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/127.0.0.0 Safari/537.36" "10.240.1.166"
runtime-1  | nginx-1            | 172.17.0.1 - - [28/Oct/2024:11:33:51 +0000] "PUT /universal-robots/java-backend/java-backend/rest-api/applications HTTP/1.1" 201 40103 "https://miserable-cobweb-
7v799jgg7pqfxpj6-80.app.github.dev/" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/127.0.0.0 Safari/537.36" "10.240.1.166"
```

Getting started

- In the new terminal run:
  - ./newurcap.sh
  - You will be prompted with a series of questions:
    - Include a Web Contribution (frontend): y
    - Include a Docker Container Contribution (backend): n
    - Name of Vendor: your name
    - Id of Vendor: your initials (or name without spaces)
    - Name of URCap Contribution: DemoContribution (or give it a name)
    - Id of URCap Contribution: demo
    - What type of URCap Web contribution should be created?: Angular
    - Include Program Node: y
    - Name of Program Node: name of programnode (no spaces), fx. KaspersPopUpProgramNode
    - Include Application Node: y
    - Name of Application Node: name of application node (not the same as name of the program node)
    - Include Smart Skill: y
    - Name of Smart Skill: name of smar skill (not the same as the program node or application node)

Enable hot-reload

- A new folder is now generated (id of urcap) expand the folder and find manifest.yml
- Add ‘devUrl: http://host.gateway.ip:4200/’ in the webArchives section:

```
webArchives:
  - id: demonode
    folder: demonode
    devUrl: http://host.gateway.ip:4200/
```

Build and install your program node

- In the terminal enter the following commands one at a time, followed by enter:
  - ‘cd demo’ (or the id of your contribution)
  - npm install
  - npm run build
  - npm run install-urcap
  - npm run start

See your urcap in Polyscope X

- In the browser tab running Polycope X
- Press the Application icon and see your new URCap
- Go to the Program tab
- Hit the blue button to insert your new program node

Test hot reload and start development

- In the explorer, find the html file for your programnode:
  - src > apps > components > ´programnode´ > ‘din program knude’.components.html
- Add some text to the html file:

```
<div *ngIf class=“inline-component”>
   some text
</div>
```

- Await recompilation of the component, it’s done when the terminal reports ‘Compiled sucesfully’
- Reload the tab running Polyscope X.
- When done, insert a new Program Node and see your change

Add some user interface

- In the HTML files we describe how the component should look like. We will add a text input field, so the user can give inputs to the component.
- We have made a set of components that can be reusedyou can find them in the ‘UI components library’. Here you can also test out their behaviours.
- Find ‘Form -> DialogInput -> Docs’
- Try out the component
- Click ‘Show code’ and copy the content to the html of your program node.

Add some user interface (continued)

- Delete the following lines:
  - disabled
  - placeholder
  - validators
  - translations
  - currentvalue
  - handleChange
  - validChange
  - blurred
  - focused
  - handleClick
- After your code has compiled you can see the new text input in Polyscope X
- Please experiment with ‘label’, ‘message’ and ‘validation’ – what happens?

```
<div *ngIf …
  <ur-dialog-input
    [type]="’text’"
    [label]="’Header’"
    [message]="’Helper text’"
    [validation]="{required: true, maxlength: 20}"
    [value]="’Value text’"
    (valueChanged)="valueChanged($event)"
  ></ur-dialog-input>
</div>
```

Persist data?

- What happens if you change the value in the input field and navigates away and back again?

- We do not persist the changes

Prepare the data model

- The interface for our program node is in the file <program node name>.node.ts
- Remove the ? from parameters
- replace ‘[key: string]: any;’ med ‘text’: string

Correct program nodes behaviour

- In <program node>.behaviour.worker.ts we can describe what our program node should be doing with the data. Right now we just need to provide some initial data.
- Find the createProgramNode method and add an initial value to the variable ‘text’

```
const createProgramNode = …
  …
  parameters: {
    ‘text’: ‘Hello world’
  }
});
```

- Correct createProgramNodeLabel, so we use our new variable:

```
const createProgramNodeLabel = … => node.parameters.text
```

- Can you see any changes in Polyscope X? (Ypu migh get an error – just create a new program)

Save changes from the user input

- In <program node name>.component.ts we can change how our program node should behave on user input. When the user changes the ‘value’, so when ‘valueChanged’ is triggered on our ur-dialog-input,we want to save it to our program node.
- In *.component.ts file, add:

```
…
  async saveNode() {
    …
  }
  async valueChanged($event: string) {
    this.contributedNode.parameters.text = $event;
    await this.saveNode()
  }
}
```

- in *.component.html ‘value’ should be changed to:

```
…
[value]=“contributedNode.parameters.text”
…
```

Generate some URScript

- Back to *.behaviour.worker.ts
- Find the method generateScriptCodeBefore
- Replace ‘new ScriptBuilder();’ with

```
{
  const sb = new ScriptBuilder();
  sb.popup(node.parameters.text, ‘title’, PopupLevel.INFO, true);
  return sb;
}
```

- Insert your program node and play your program (delete the program node you already inserted)

Congratulations you have now build a program node

- You can now build on the functionality of yoyur program node.
- You can find inspiration for your new user interface component in the UI component library: https://psx-storybook.universal-robots.com/0.17.5/?path=/docs/welcome--docs
- You can find inspiration for URScript in the ‘Script manual’: https://docs.universal-robots.com/PolyScopeX_SDK_Documentation/build/PSX-SDK-v0.12/_downloads/4dfc6a57b84e54a4c81b585d33472730/scriptManualG5.pdf

Bonus slide

Find something you find interesting

Install your urcap on the robot

- For now you have tested the urcap in a simulator. Let’s try it on the robot.
- In the target/ folder, right-click and download the urcapx file:
- Put it on a USB stick and install it on the robot.

Try an application node or a smart skill

- Each contribution type is available in the components directory and has a similar structor
- De har samme opbygning som program bidrager:
  - *.node.ts
  - *.component.ts
  - *.behaviour.worker.ts