

Injector Trees

Many Injectors
arranged in two trees

Injector trees

- Angular arrange the injectors in 2 trees
 - Element injector tree
 - Module injector tree

Element injector tree

- Made out from ElementInjector
- Every time you supply value in **providers** array in a **Component/Directive** metadata you add a child to the tree
- Every DOM element can have an Injector.
- When asking for data from the **DI** inside a **Component/Directive** angular will traverse the tree starting from the closes **ElementInjector** and moving up till it finds the data

Module injector tree

- Made out from **ModuleInjectors**
- This tree is made from the root injector
- Every time we load a lazy loaded module, we add a child to the tree
- Every injector here is loaded with:
 - **providers** - array
 - **imports** - array recursively loading from other modules providers array

DI algorithm - Part 1 - find the tree

- To understand how the DI works we first need to understand what tree will the search start
- If we are asking in the constructor of a **Component/Directive/Pipe** angular will start from the nearest injector in the **Element Tree**
- If we are asking the DI in a constructor of a module, angular will search the nearest **Injector** in the **Module Tree**
- If we are in a service it depends on which of the above requested for the service recursively.

DI algorithm - Part 2 - Traverse the tree

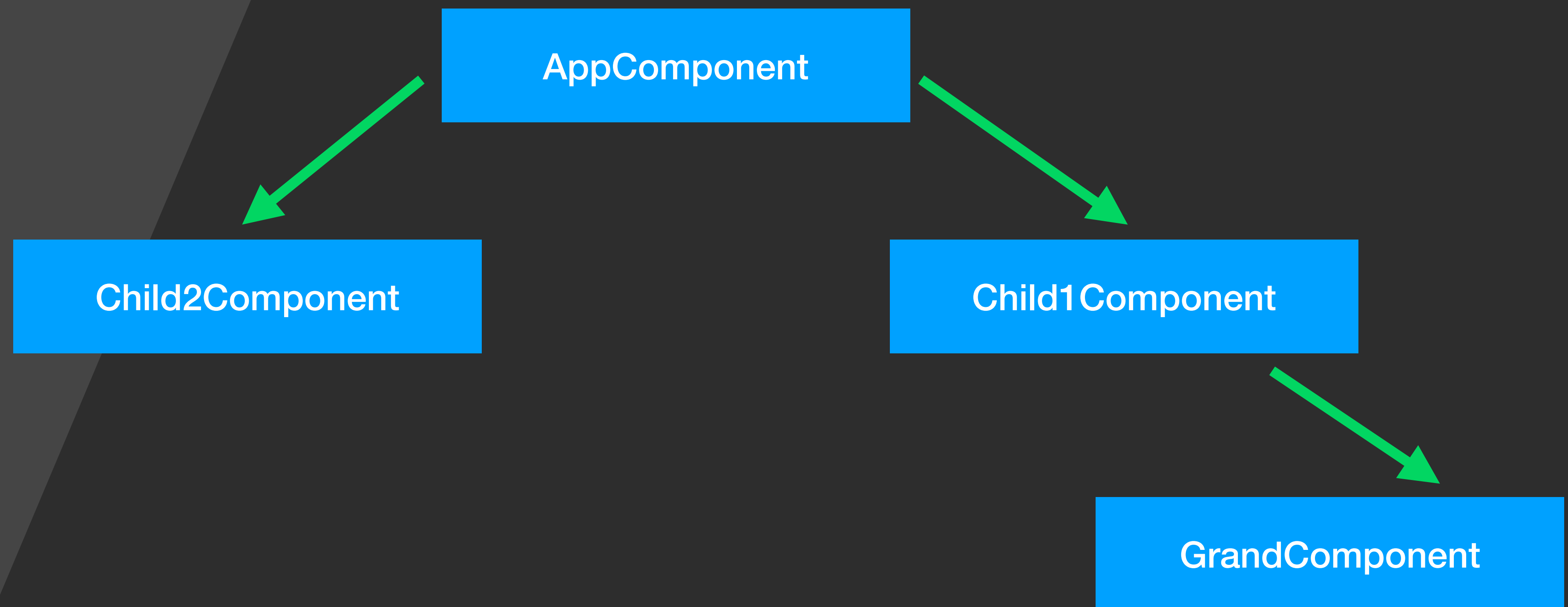
- After finding the tree and the nearest injector start traversing the tree asking each injector if it can find the data we are looking for
- If we are on the Element tree and the data was not found we start looking in the module tree starting again with the nearest module injector to whomever originated the request

Exercise

Injector element tree

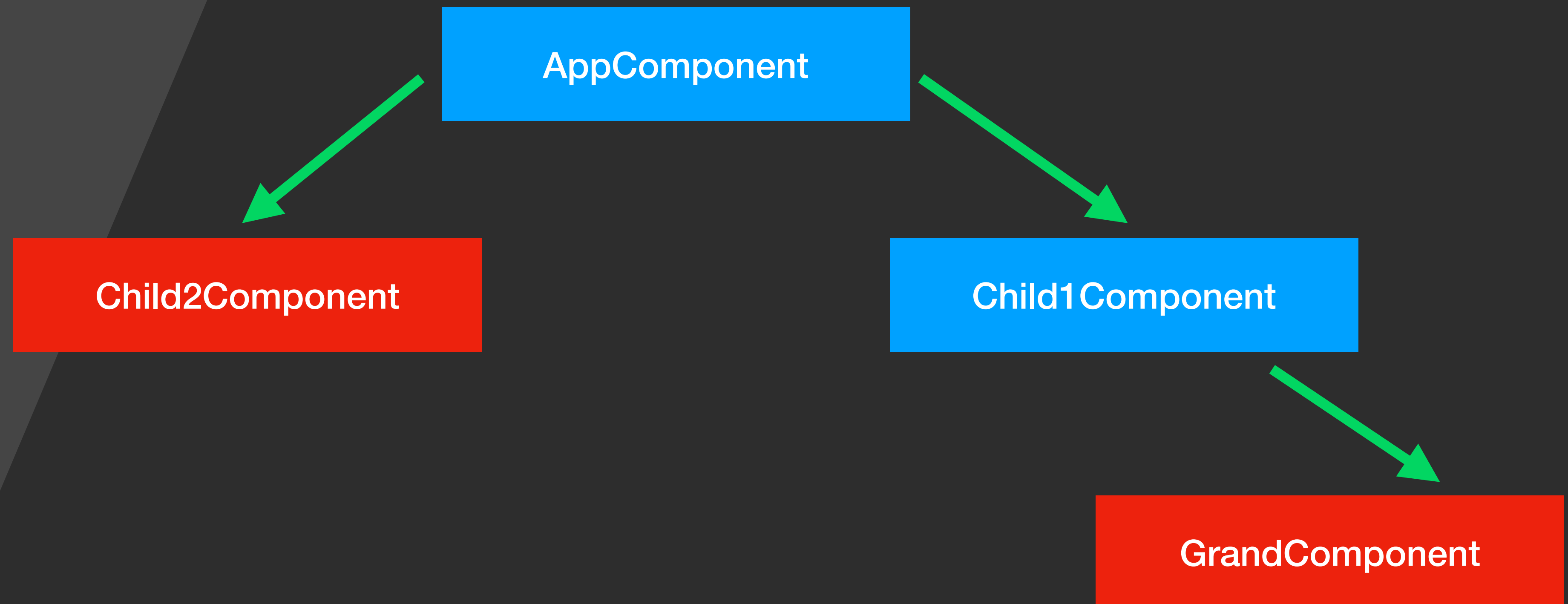
Ex. Injector Element Tree

- Create the following component tree, where every component should display a simple message identifying that component from the other components



Ex. Injector Element Tree

- The blue components should register a message with the Injector
- The “red” components should read the message from the DI
- Based on the algorithm we learned, from where will they get their message?

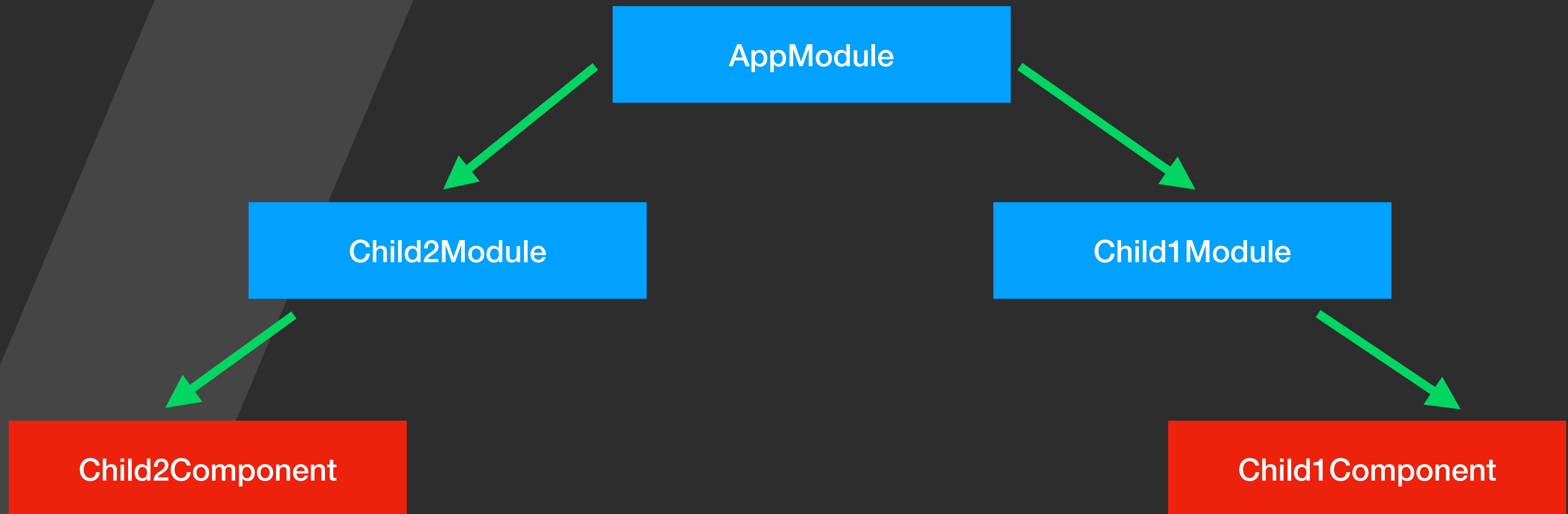


Exercise

Module injector tree

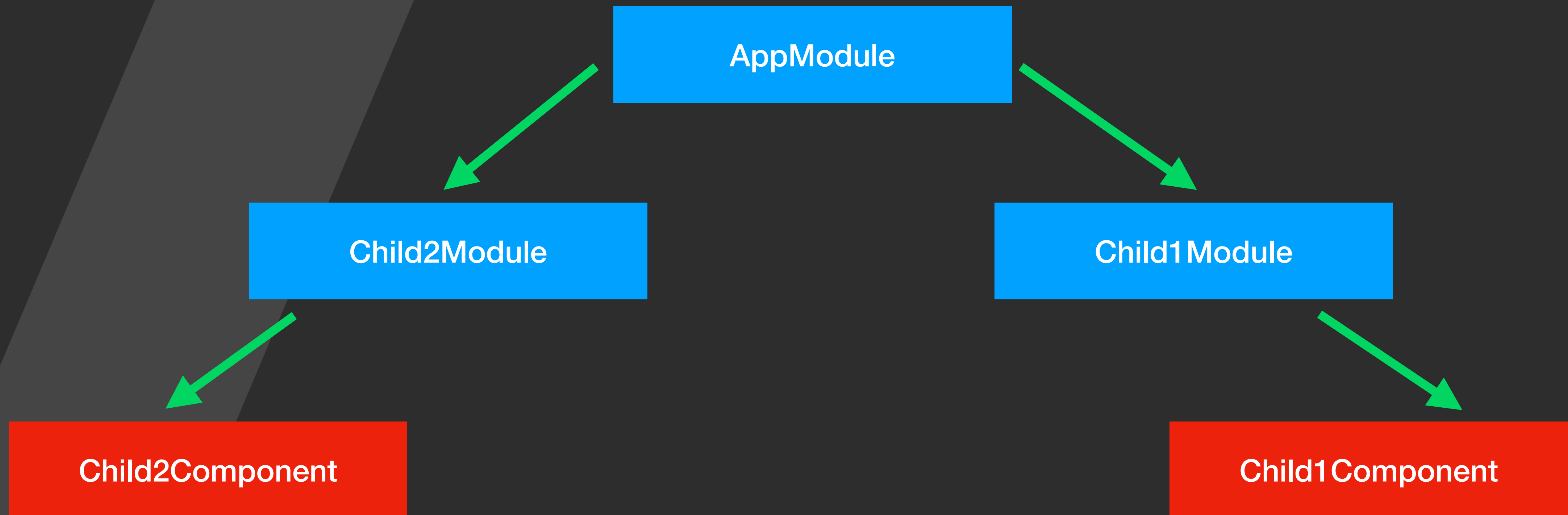
Ex. Module injector tree

- The blue blocks are lazy loaded modules you need to create
- The red are components in the lazy loaded modules



Ex. Module injector tree

- Provide a message in the **AppModule**, and in the **Child1Module** Injector
- Ask for that service in the components you created: **Child1Component**, **Child2Component**



Fine tuning the DI Search algorithm

- We use decorators to further control how the DI search algorithm will work
- For example:

```
constructor(@SomeDIDecorator() private _http: HttpClient) {}
```

@Optional()

- If you didn't find the requested item in all the injectors and in all the trees, just assign null to the variable (the default behaviour is to throw exception)

```
constructor(@SomeDIDecorator() private _http: HttpClient) {}
```

@Self() / @SkipSelf

- @Self - Will look for the data only in the component / directive element injector and will not traverse the tree
- @SkipSelf- will start the search from my parent

```
constructor(@Self() private _http: HttpClient) {}
```

```
constructor(@SkipSelf() private _http: HttpClient) {}
```

- If I'm a projected component (ng-content) will limit the search up to my host

```
constructor(@Host() private _http: HttpClient) {}
```


Summary

- Angular is making 2 Trees of injectors: Element and Module
- Angular will traverse the trees looking from the closes injector and looking up the tree
- After finishing with the element tree angular will keep searching in the module tree
- We can fine tune the search algorithm with additional decorators.

Thank You

Next Lesson: Providers

recipe for Injectors how to create values