Technische Universität Braunschweig

ISF

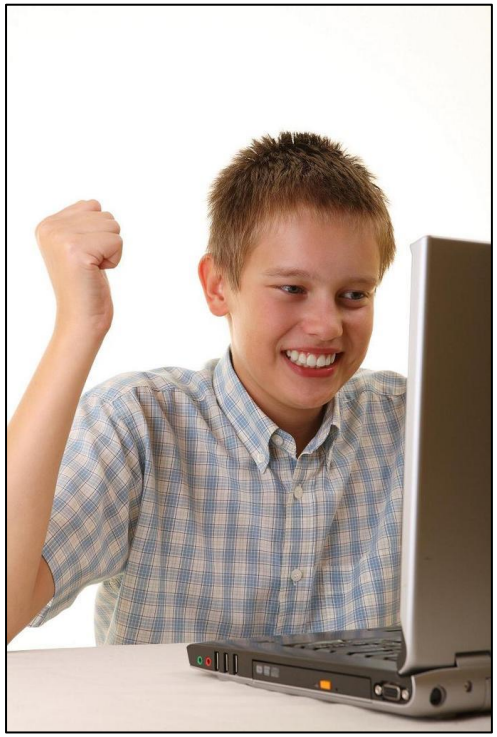
Easy Game Generator

Modellbasierte Softwareentwicklung

Adrian Hoff, Sebastian Hofmann, Victoria Sack

07.03.2018

Motivation



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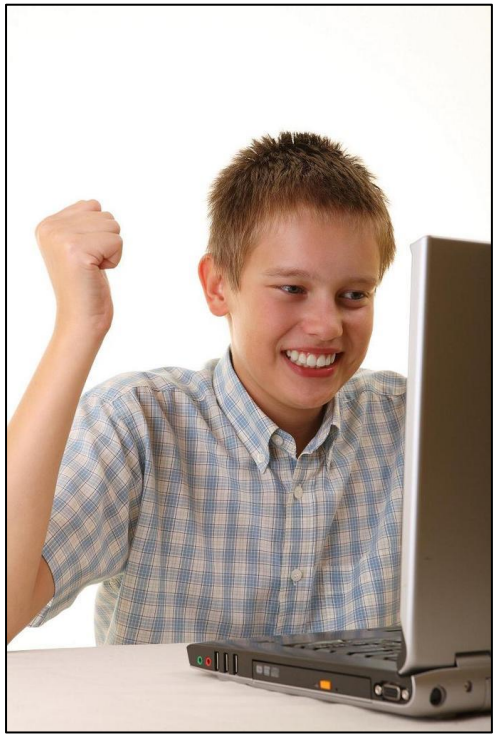

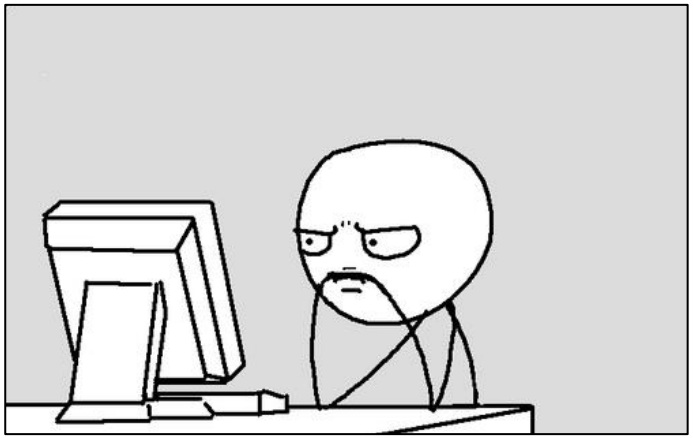

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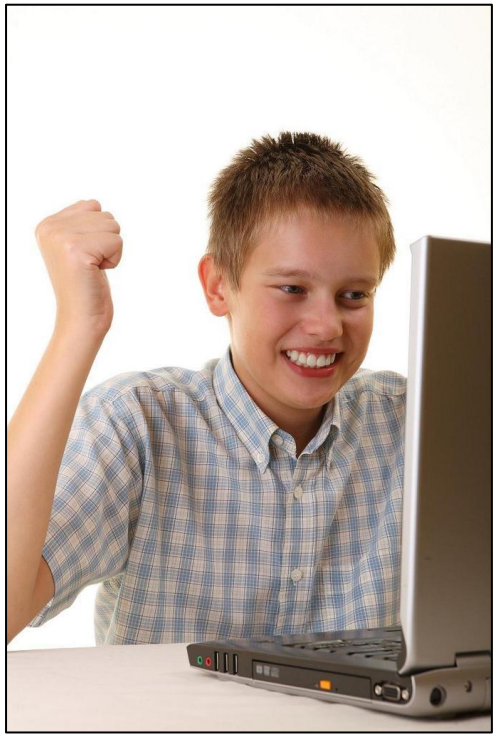

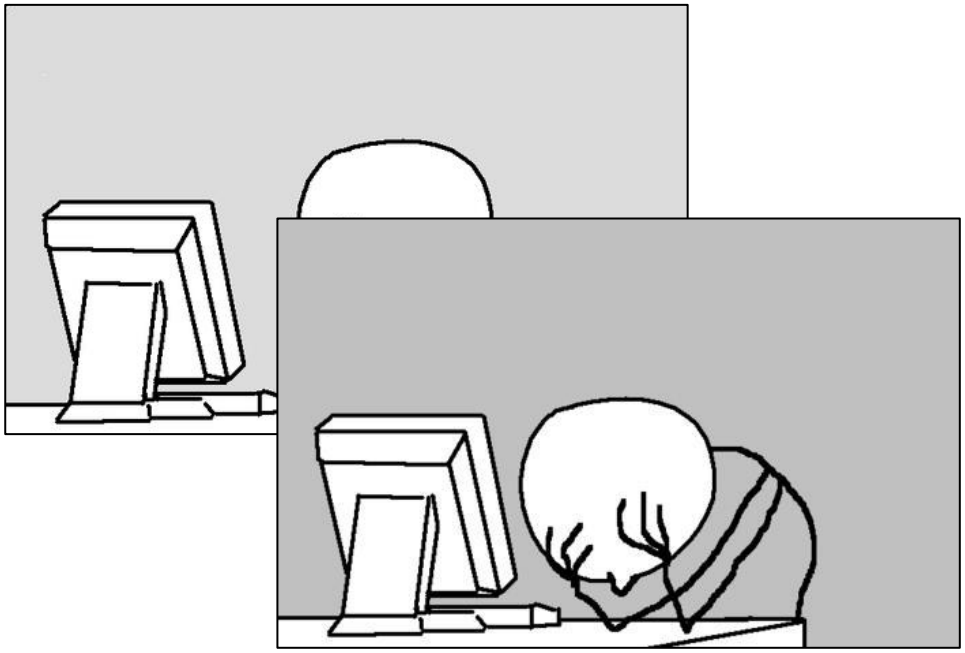

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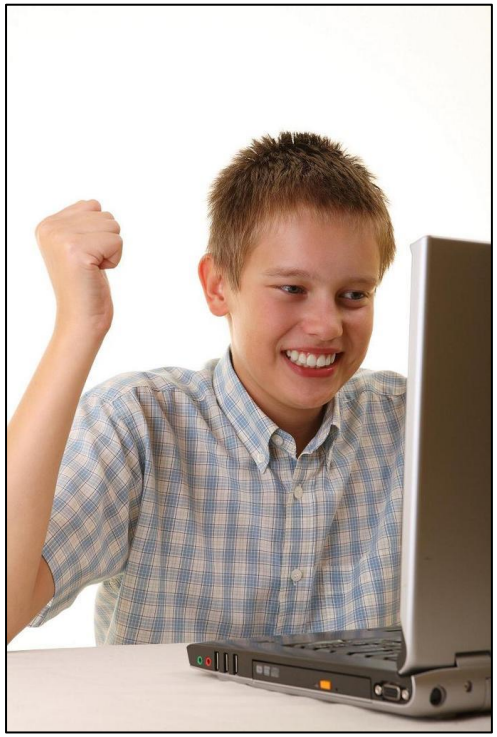
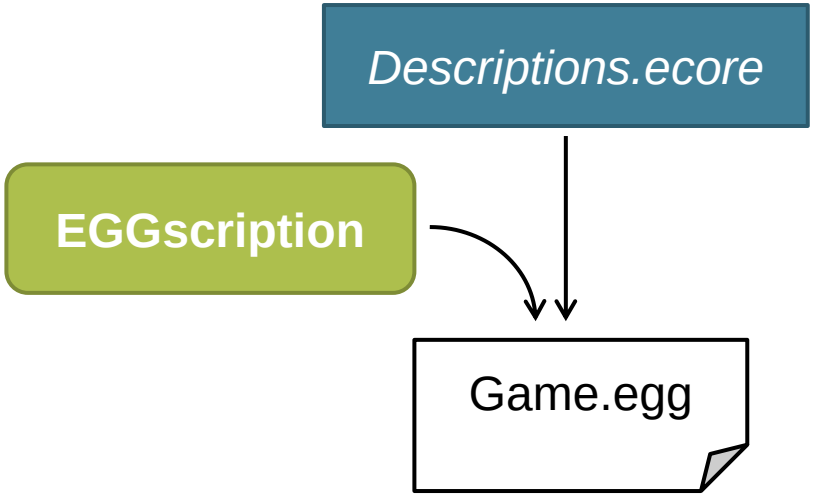


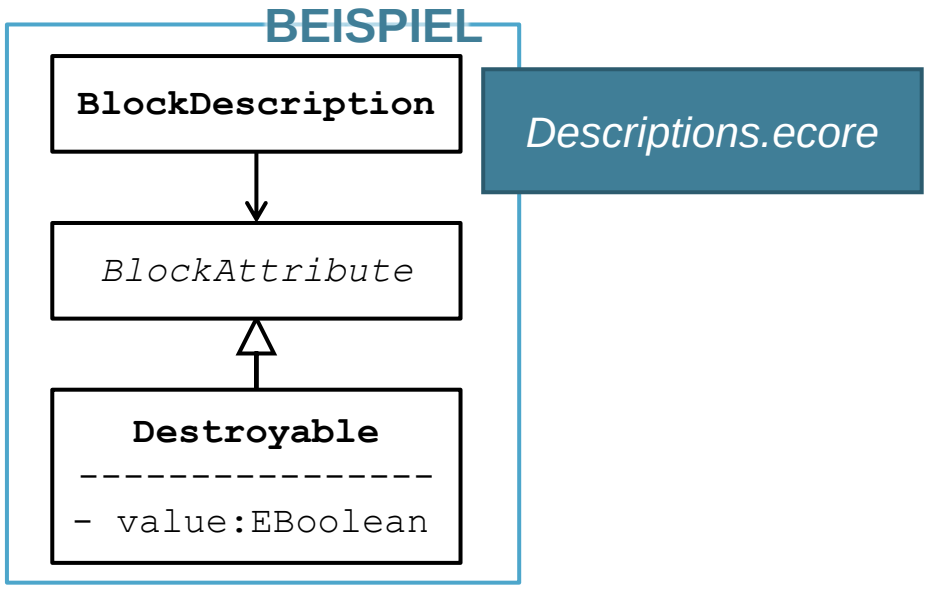
Die textuelle DSL: EGGscription



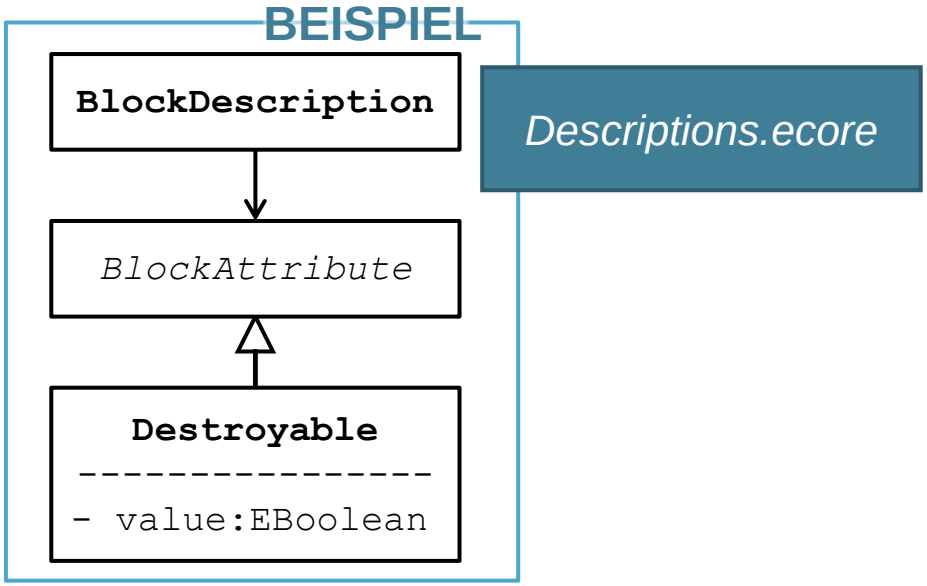
EGGscription

- platform:/resource/de.tu_bs.cs.isf.mbse.egg/models/descriptions.ecore
  - descriptions
    - Import
    - DescriptionRoot
    - Description
    - gui
      - PageDescription -> Description
      - MenuPageDescription -> PageDescription
      - TextPageDescription -> PageDescription
    - gameelements
      - BlockDescription -> Description
      - ItemDescription -> Description
      - HeroDescription -> Description
      - EnemyDescription -> Description
    - auxiliary
      - AnimationDescription -> BlockAttribute, HeroAttribute, EnemyAttribute, ItemAttribute, TextPageAttribute
      - TextPageAnimationDescription -> AnimationDescription, PositionedElement
      - AnimationAttribute -> UniqueAttribute
      - Pictures -> AnimationAttribute
      - Duration -> AnimationAttribute
  - attributes
    - UniqueAttribute
    - block
      - BlockAttribute -> UniqueAttribute
      - Destroyable -> BlockAttribute
      - Movable -> BlockAttribute
      - NoCollision -> BlockAttribute
    - character
      - CollisionBox -> HeroAttribute, EnemyAttribute
      - ShowCollisionBox -> HeroAttribute, EnemyAttribute
      - EnemyAttribute -> UniqueAttribute
      - HeroAttribute -> UniqueAttribute
      - Speed -> HeroAttribute, EnemyAttribute
      - JumpPower -> HeroAttribute, EnemyAttribute
      - MaxLife -> HeroAttribute, EnemyAttribute
      - Strength -> HeroAttribute, EnemyAttribute
      - IdleAnimation -> HeroAttribute, EnemyAttribute
      - RunAnimation -> HeroAttribute, EnemyAttribute
      - JumpAnimation -> HeroAttribute, EnemyAttribute
      - InventorySize -> HeroAttribute
      - IntelligenceLevel -> EnemyAttribute
      - Intelligence
      - InventoryItemsTypes -> HeroAttribute, EnemyAttribute
      - InventoryItemsCounts -> HeroAttribute, EnemyAttribute
      - MeleeAttackAnimation -> HeroAttribute, EnemyAttribute
      - RangeAttackAnimation -> HeroAttribute, EnemyAttribute
      - RangeAttackEnabled -> HeroAttribute, EnemyAttribute
      - DynamicOCProperties
    - item
      - ItemAttribute
      - Consumable -> ItemAttribute, UniqueAttribute
      - Usable -> ItemAttribute, UniqueAttribute
      - ScorePoints -> ItemAttribute, UniqueAttribute
      - Effect -> ItemAttribute
    - gui
      - MenuPageAttribute
      - TextPageAttribute
      - Logo -> MenuPageAttribute
      - Title -> MenuPageAttribute, TextPageAttribute
      - NextPage -> TextPageAttribute
      - Text -> TextPageAttribute
      - BackgroundImage -> TextPageAttribute, MenuPageAttribute
      - BackgroundColor -> TextPageAttribute, MenuPageAttribute
      - Button -> MenuPageAttribute
      - StartPage -> MenuPageAttribute, TextPageAttribute
      - FontColor -> TextPageAttribute, MenuPageAttribute
      - FontSize -> TextPageAttribute, MenuPageAttribute

EGGscription



EGGscription



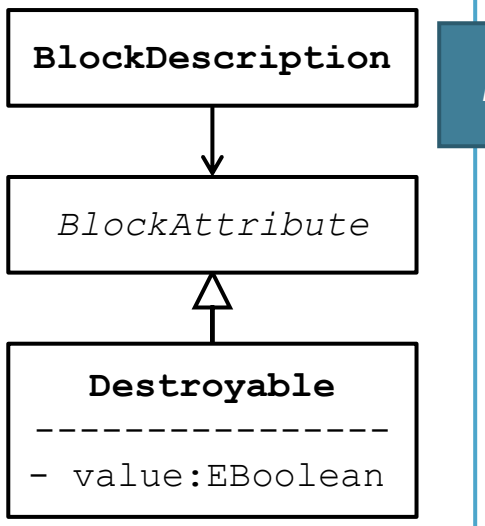
BEISPIEL

```
BlockDescription returns
gameelements::BlockDescription:
   {gameelements::BlockDescription}
   'Block'
   name=EString
   '{'
      (properties += BlockAttribute ';')*
   '}'
;

BlockAttribute returns
block::BlockAttribute:
   Destroyable | Movable | NoCollision
;

Destroyable returns block::Destroyable:
   {block::Destroyable}
   (value ?= 'destroyable')
;
```

EggScription.xtext

EGGscription

BEISPIEL



Descriptions.ecore

BEISPIEL

```
BlockDescription returns
gameelements::BlockDescription:
   {gameelements::BlockDescription}
   'Block'
   name=EString
   '{'
      (properties += BlockAttribute ';')*
   '}'
;

BlockAttribute returns
block::BlockAttribute:
   Destroyable | Movable | NoCollision
;

Destroyable returns block::Destroyable:
   {block::Destroyable}
   (value ?= 'destroyable')
;
```

EggScription.xtext

BEISPIEL

- **destroyable => !noCollision**
- **Unique identifiers**
- **maxLife > 0**
- **Uniqueness of attributes**
- **...**

= 18 Constraints

EggScriptionValidator.xtend

EGGscription: Xtext-basierte DSL

BEISPIEL

```
Block earth {
    destroyable;
    movable;
    Animation {
        pictures <01.jpg>;
        duration 1;
    };
}
```

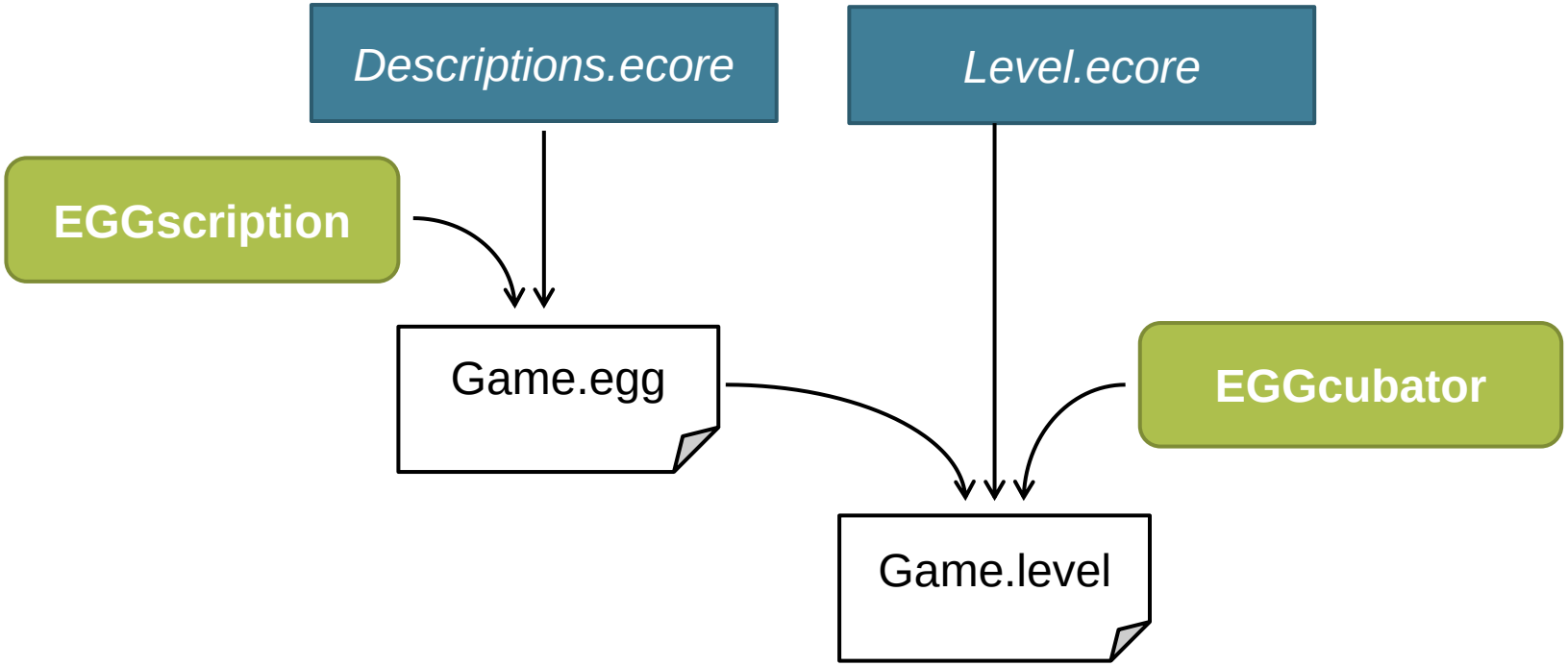
BEISPIEL

```
Item apple {
    consumable;
    scorePoints 1;
    effect SPEED +10;
    effect STRENGTH -10;
    Animation {
        duration 1;
        pictures <01.jpg>;
    };
}
```

BEISPIEL

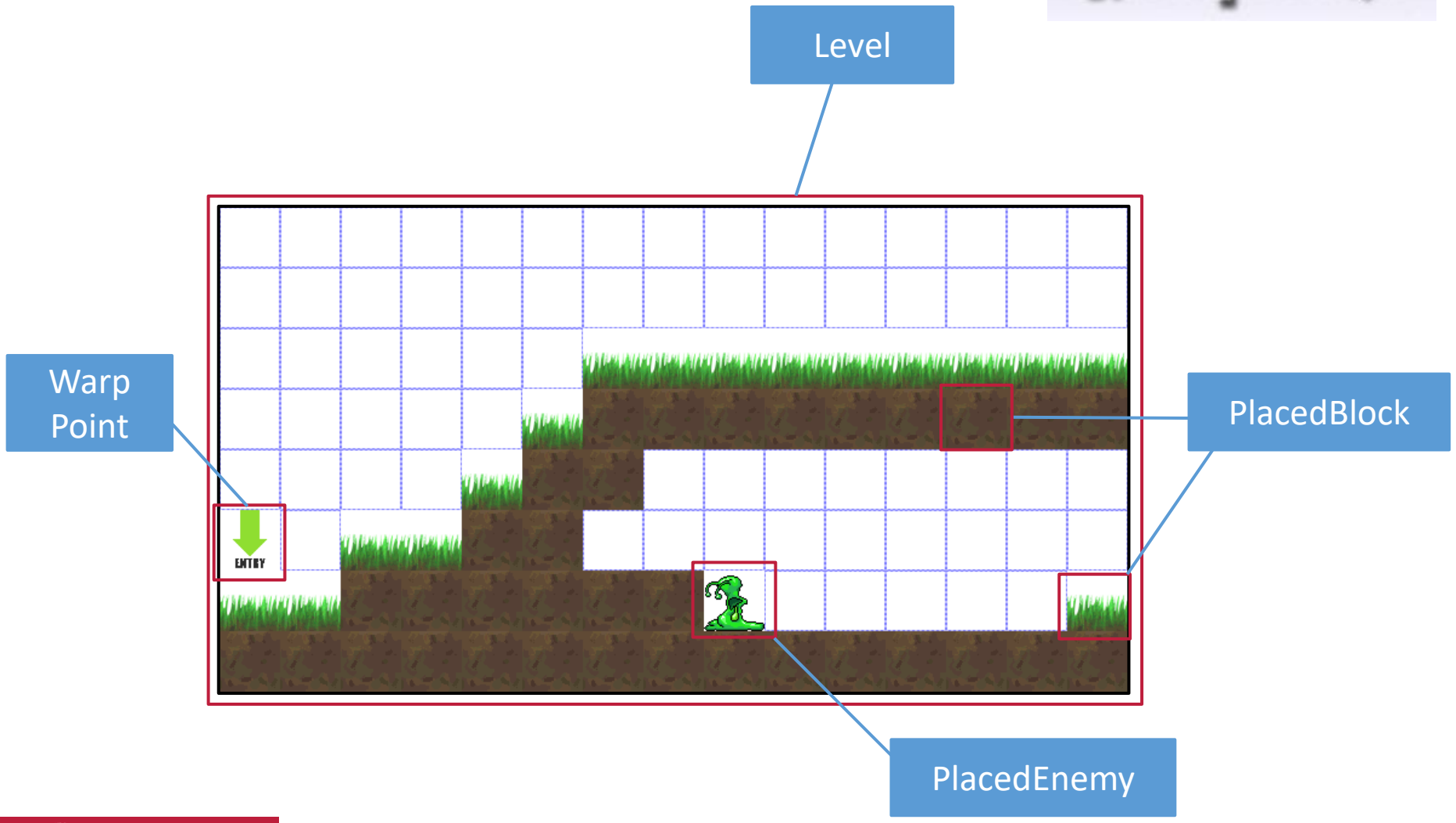
```
Hero marshmallowUnicorn {
    rangeAttackEnabled;
    inventoryItemTypes apple;
    inventoryItemCounts 1;
    speed 100;
    strength 100;
    jumpPower 12;
    maxLife 10;
    inventorySize 5;
    run Animation {
        pictures <01.jpg>;
        duration 1;
    };
    jump Animation {
        pictures <01.jpg>;
        duration 1;
    };
    range Animation {
        pictures <01.jpg>;
        duration 1;
    };
}
```

Die grafische DSL: EGGcubator



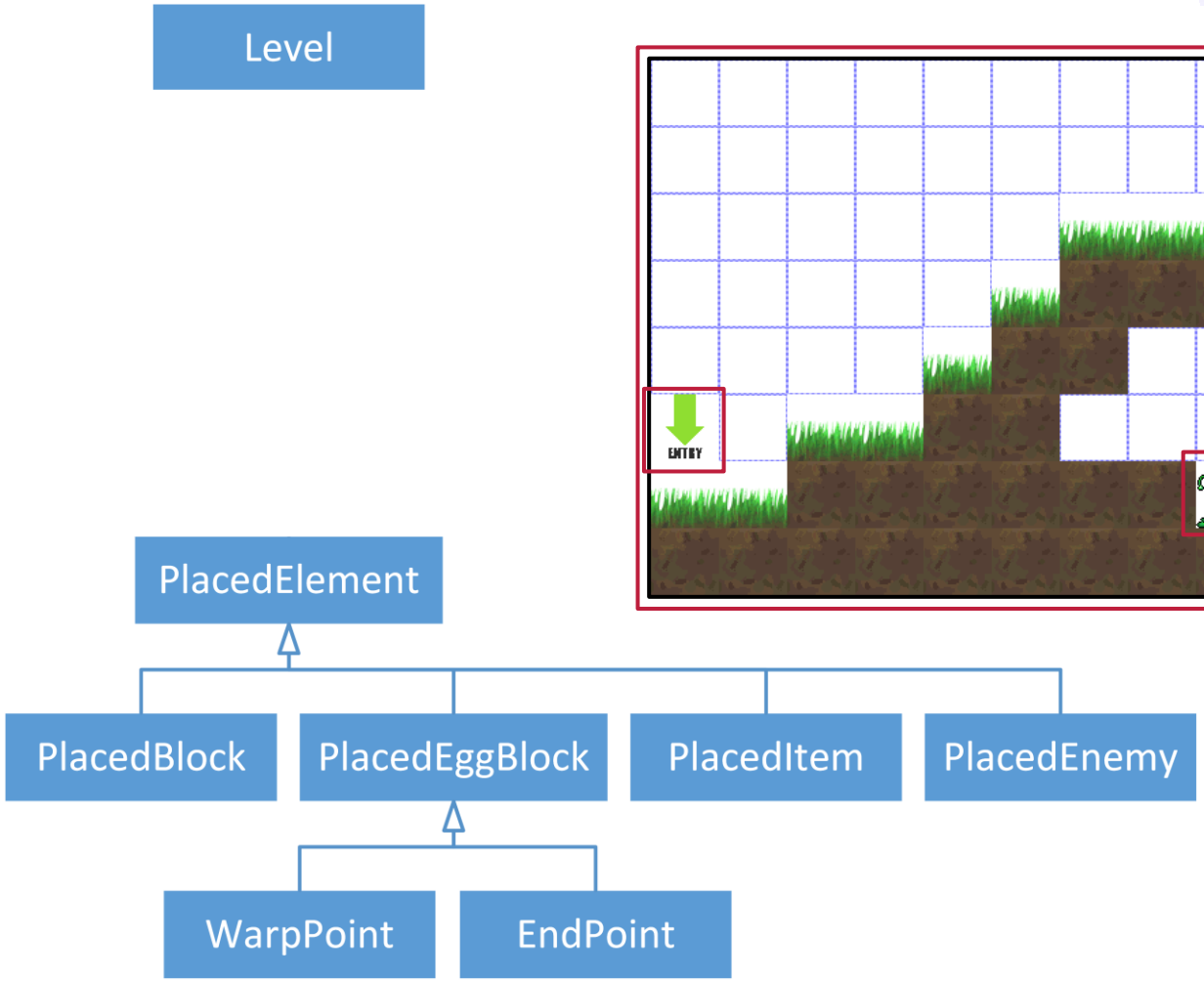
EGGcubator

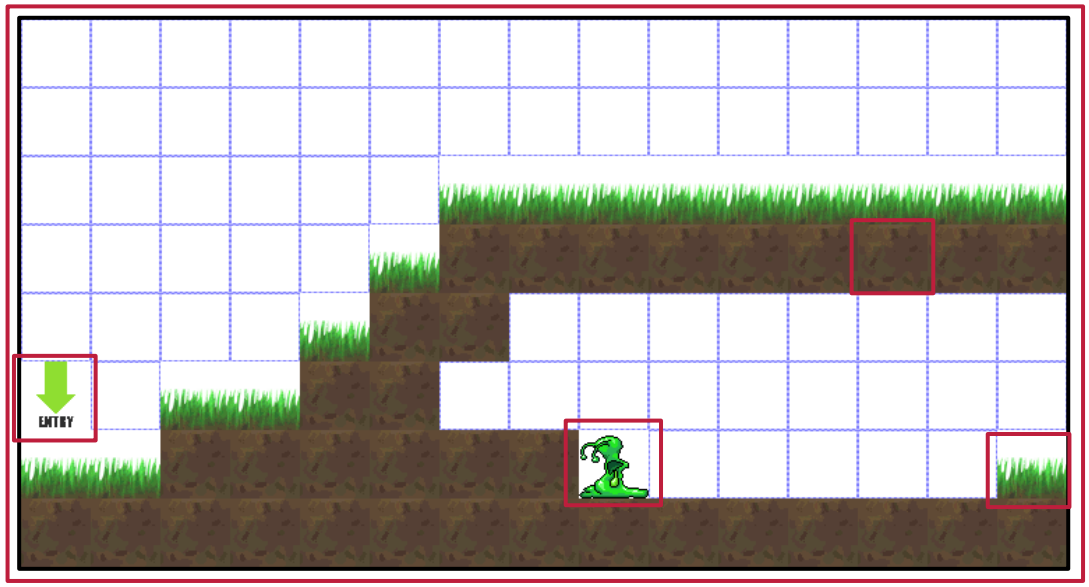
Graphiti



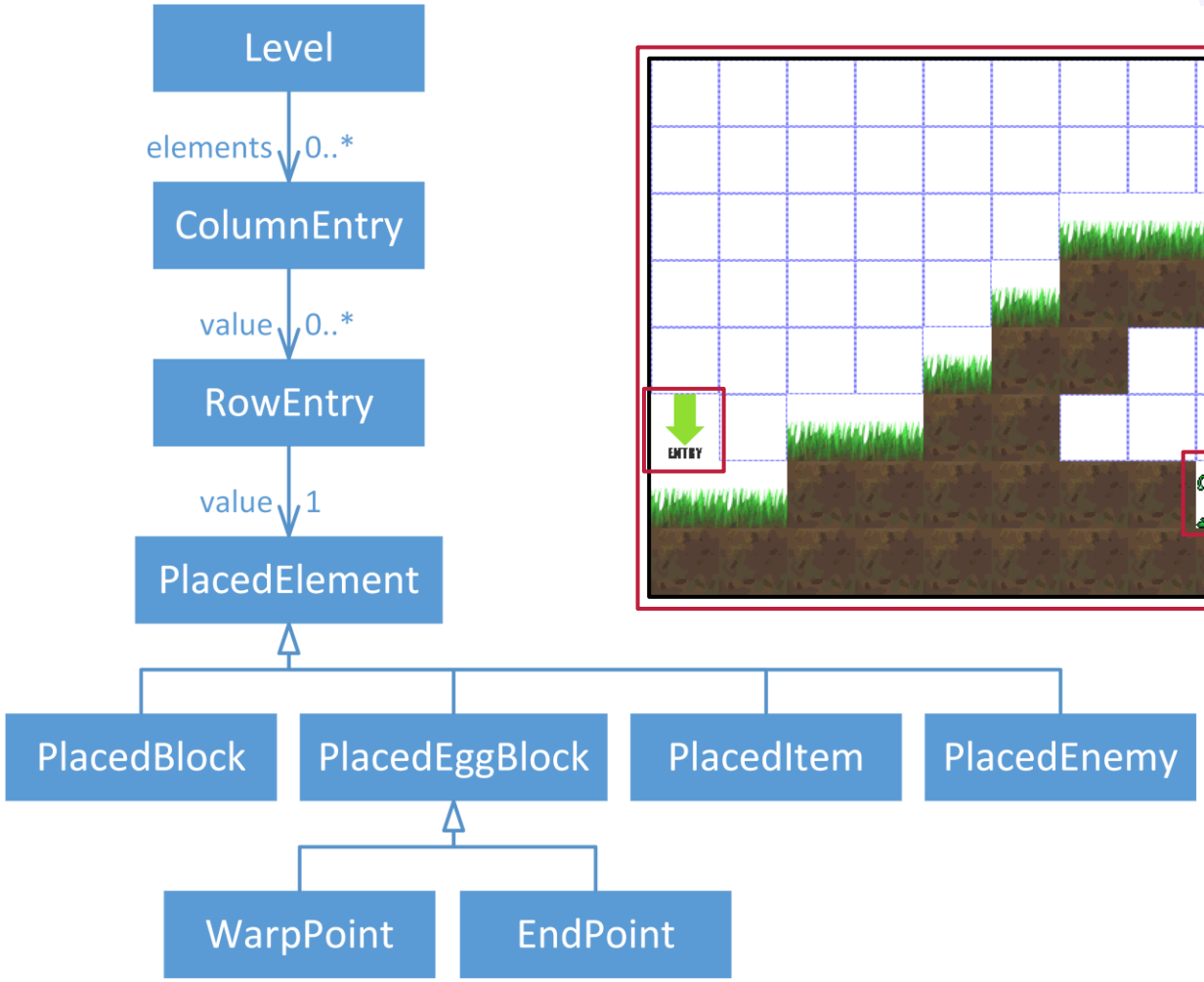
EGGcubator

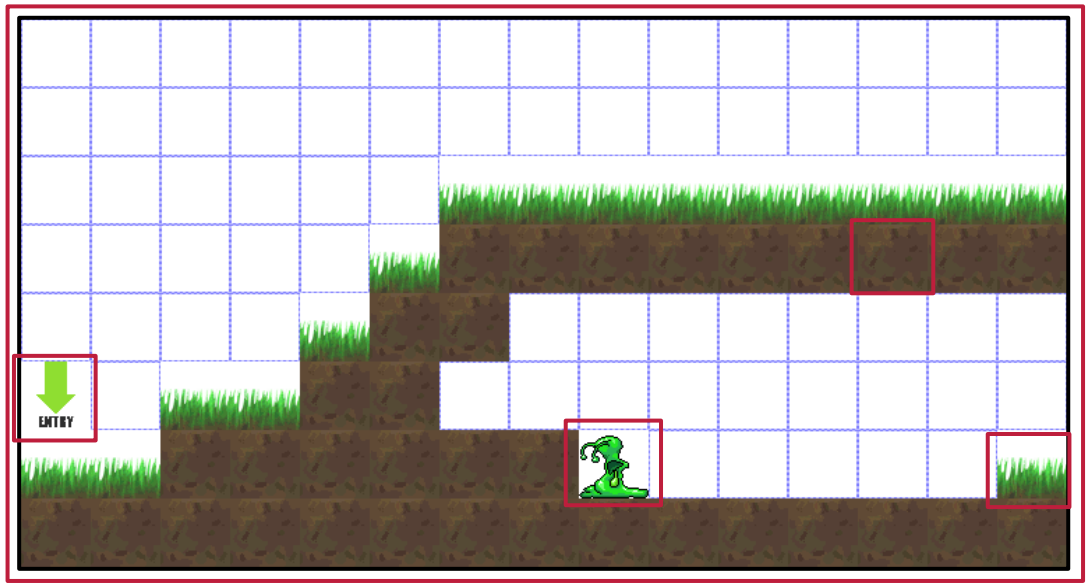
Graphiti





EGGcubator

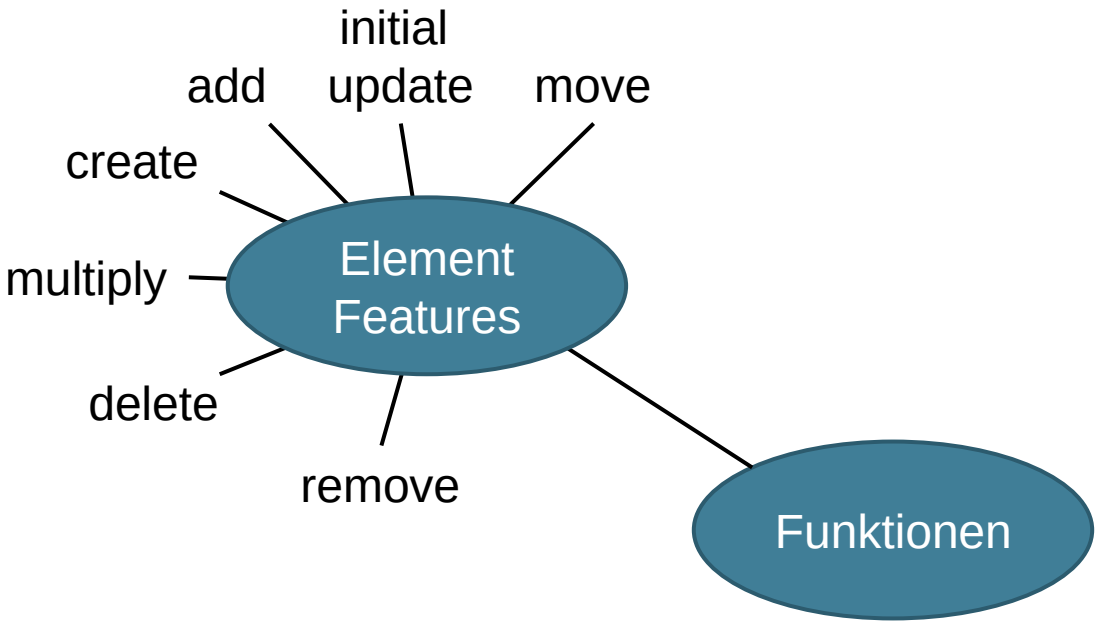

Level
elements
0..*
ColumnEntry
value
0..*
RowEntry
value
1
PlacedElement
PlacedBlock
PlacedEggBlock
PlacedItem
PlacedEnemy
WarpPoint
EndPoint


ENTRY

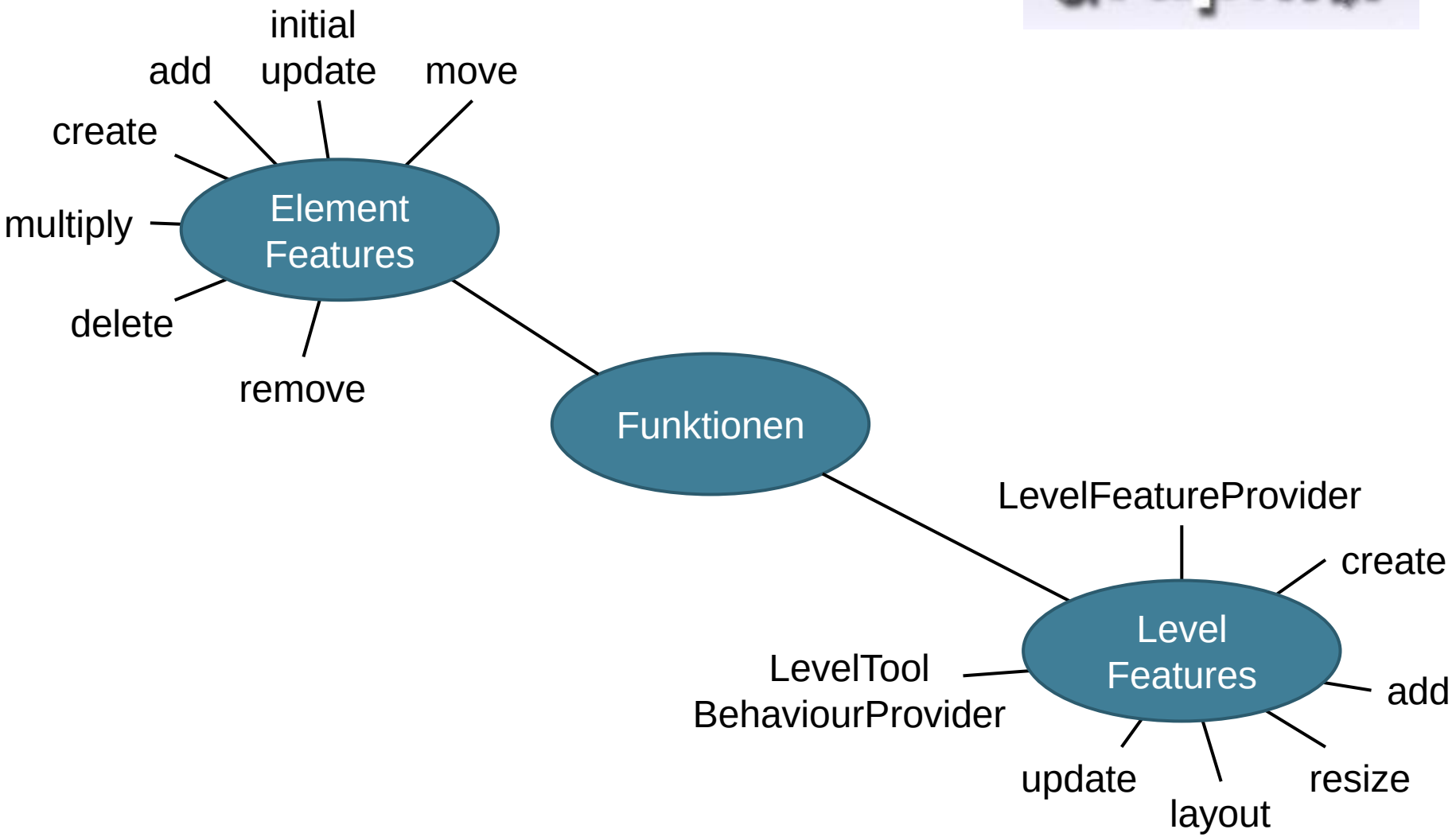
EGGcubator

Graphiti

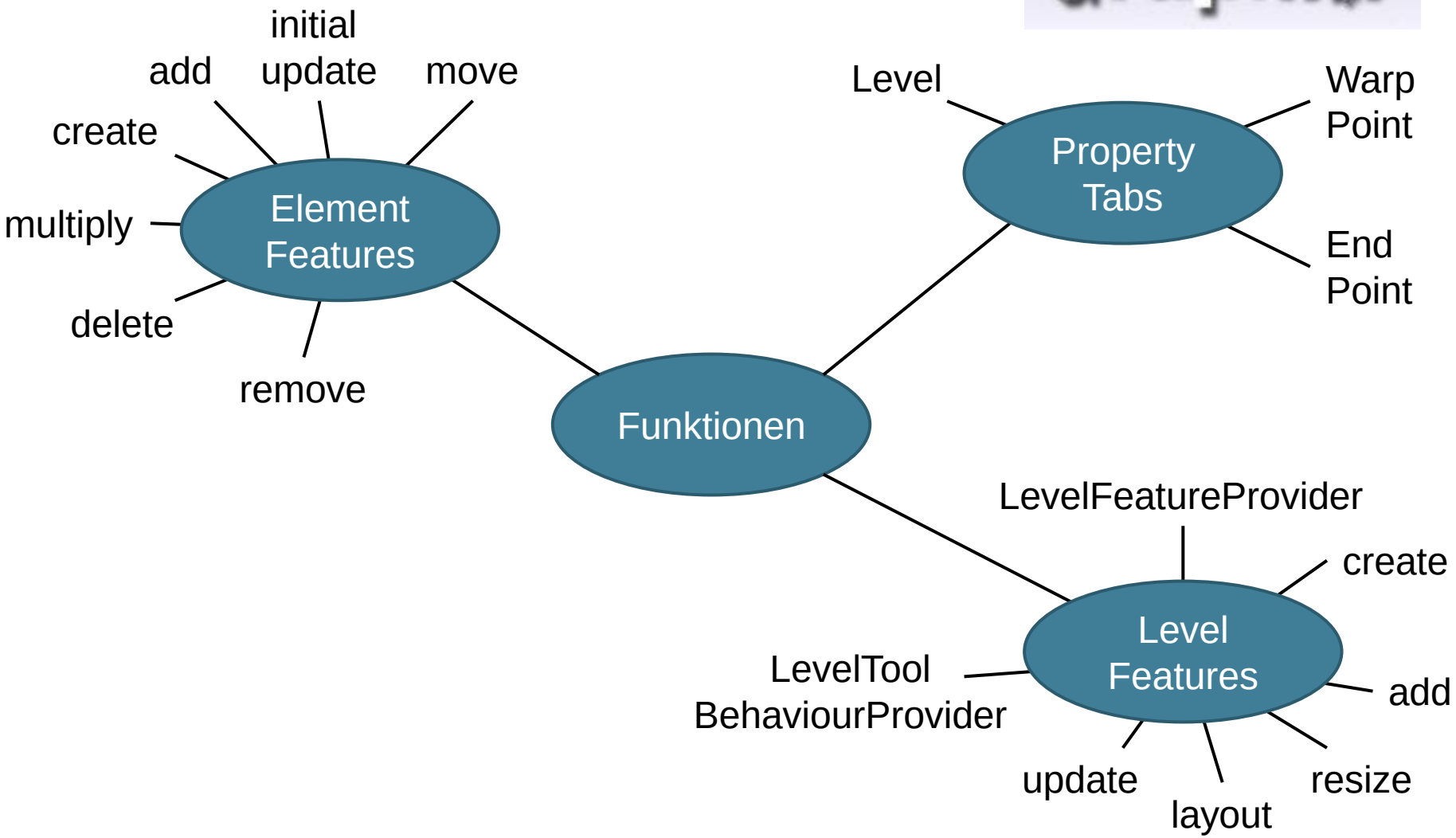
EGGcubator


initial
add
update
move
create
multiply
Element Features
delete
remove
Funktionen

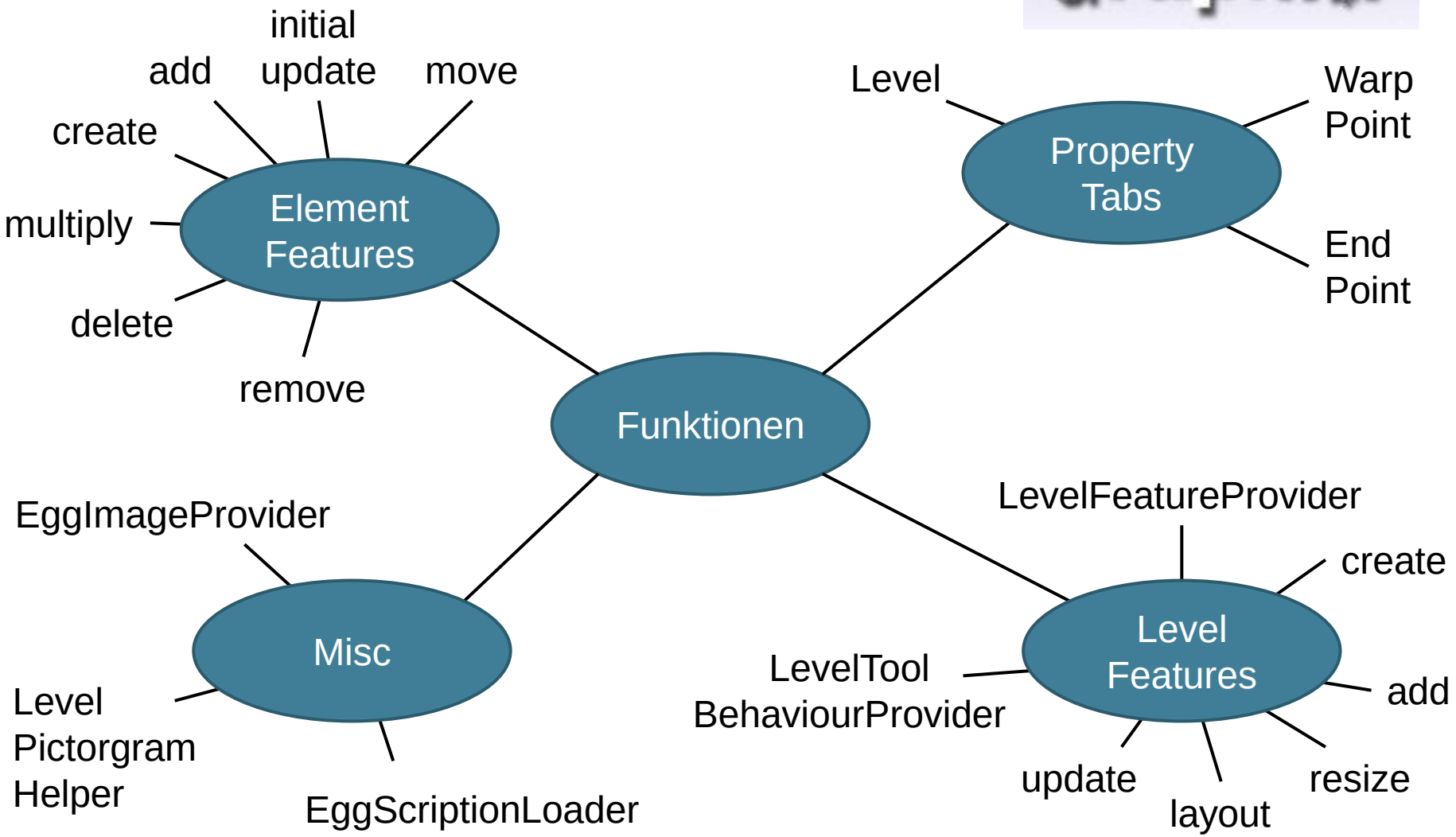
EGGcubator


initial
add
update
move
create
multiply
Element Features
delete
remove
Funktionen
LevelFeatureProvider
create
Level Features
LevelTool BehaviourProvider
add
update
layout
resize

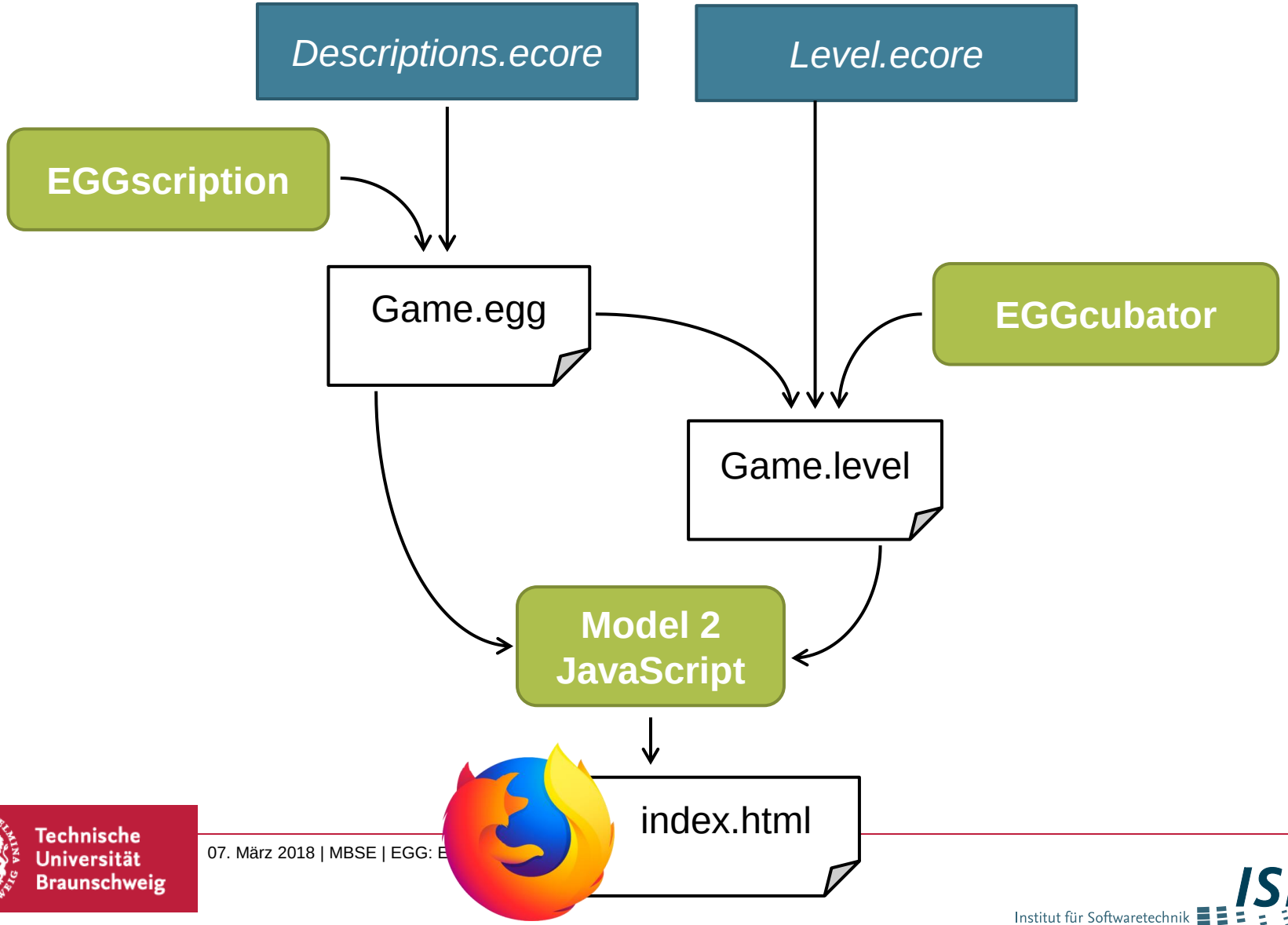
EGGcubator


initial
add
update
move
create
multiply
delete
remove
Element Features
Level
Warp Point
Property Tabs
End Point
Funktionen
LevelFeatureProvider
create
Level Features
LevelTool BehaviourProvider
add
update
layout
resize

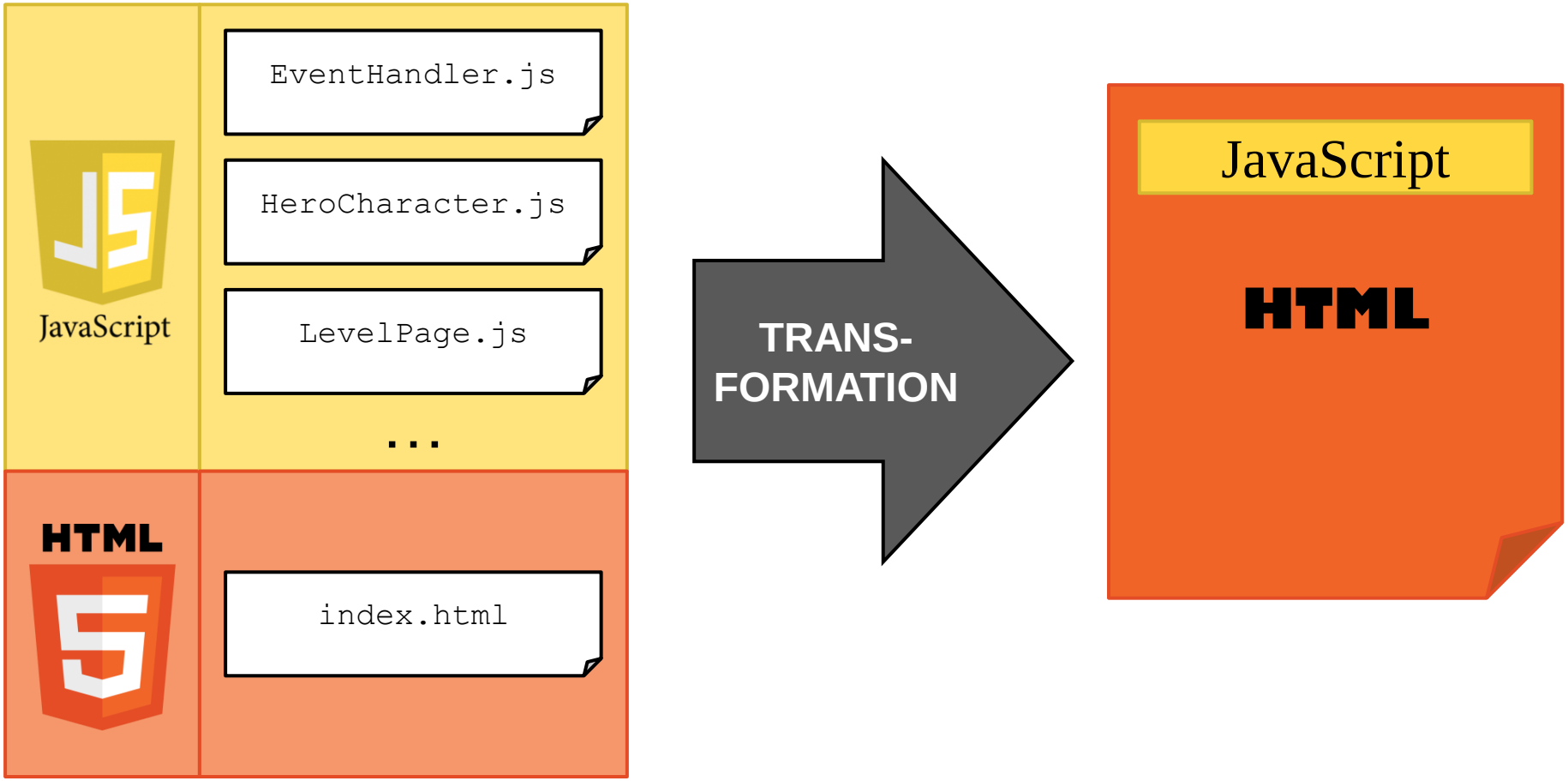
EGGcubator


initial
add
update
move
create
multiply
delete
remove
Element Features
Level
Warp Point
Property Tabs
End Point
Funktionen
EggImageProvider
Misc
Level Pictorgram Helper
EggScriptionLoader
LevelFeatureProvider
create
Level Features
LevelTool BehaviourProvider
add
update
layout
resize

Putting it together – Model 2 Text



Model 2 JavaScript



Future Features!

Destroyable/ Movable Blocks

EnemyIQ

Attacks

Logik

Loot

Item Effects

Game-specific Constraints

Items

Sound Effects