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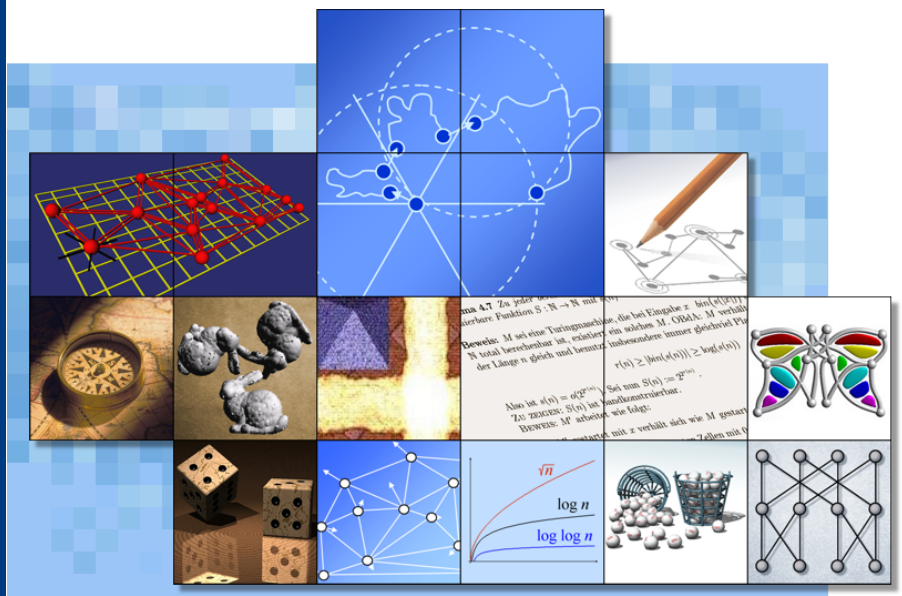
Algorithms and Complexity

EScript

Short Presentation of a Scripting Language



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Benjamin Eikel

Overview

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2 Data Types

3 Control Structures

4 Other Features

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What is EScript?

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EScript . . .

- is an object-oriented scripting language.
- is internally compiled and executed by a virtual machine.
- has a similar syntax to C.
- was developed to use C++ objects from scripts easily.
- is released under a free software license.
- is available from `http://escript.berlios.de/`.

First Example

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- EScript files should have the extension `.escript`.
- The EScript parser analyzes the script file line by line.
- A simple script:

```
out("Hello, world!\n");
```

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Number

```
1        27.4        0x1a        25 / 5        3 + 4
```

String

```
"an"        'example'        "hello"+ ', ' + "world"
```

Bool

`true` **`false`**

Void

`void`

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var

```
/*
   Declaring a variable is done using the keyword
   "var", an identifier, an equation sign, and an
   expression on the right side. The type of the
   variable is deduced from the expression on the
   right side.
 */
var xPos = 500 - 80 / 2;

// The variable "message" will be of type String
var message = "Please click the button";

// Dynamically change the type to Number
message = 5;
```

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fn

```
var square = fn(num) {
    return num * num;
};
var a = square(5);
var b = square(4.2);
```

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Array

```
var numbers = [3, 23, 7, 3, 100, 1, 35];
var colors = ["red", "green", "blue"];
```

Map

```
var fruits = {
    "lemon" : "yellow",
    "cherry" : "red"
};
fruits["apple"] = "green";
```

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ExtObject

```
var car = new ExtObject();
car.color := "red";
car.speed := 190;
car.outputDesc := fn() {
    out("This is a ", this.color, " car ");
    out("with top speed ", this.speed, ".\n");
};

...

car.speed = 185;
car.outputDesc();
```

Output: This is a red car with top speed 185.

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Type

```
var Shape = new Type();
Shape.color := "white";

// New type that is derived from Shape
var Polygon = new Type(Shape);
Polygon.numVertices := 3;

// New type that is derived from Shape
var Circle = new Type(Shape);
Circle.radius := 0;

var circle = new Circle();
circle.color = "red";
circle.radius = 5;
```

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if

```
var result = /* some function */;
if(result) {
    out("Success");
} else {
    out("Failure");
}

var num = /* some number */;
if(num < 0) {
    out("Too small");
} else if(num >= 0 && num <= 100) {
    out("Range okay");
} else {
    out("Too large");
}
```

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? (conditional operator)

```
var num = /* some number */;
var positive = (num > 0) ? true : false;
```

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? (conditional operator)

```
var num = /* some number */;
var positive = (num > 0) ? true : false;
```

Note: There is no `switch` in EScript.

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while

```
var tasks = [/* some tasks */];
while(!tasks.empty()) {
    var firstTask = tasks.front();
    tasks.popFront();
    // do something with first task
}
```

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for

```
var sum = 0;
for(var i = 0; i < 100; ++i) {
    sum += i;
}
out("Sum of numbers: ", sum, "\n");
```

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foreach

```
var chars = ["a", "c", "k", "b", "d", "x", "j"];
foreach(chars as var c) {
    if(c == "x") {
        out("Character \"x\" found.");
        break;
    }
}
```

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Call a function on another object.

Example

```
var printOut = fn() {
    out("I am a " + this.color + " node.\n");
};

var nodeRed = new ExtObject();
nodeRed.color := "red";
var nodeBlack = new ExtObject();
nodeBlack.color := "black";

var printOutRed = nodeRed -> printOut;
var printOutBlack = nodeBlack -> printOut;

printOutRed(); // Output: I am a red node.
printOutBlack(); // Output: I am a black node.
```

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Example

```
var Polygon = new Type();
Polygon.vertices @(private, init) := Array;
Polygon.shapeType @(const) := "Polygon";

Polygon.getNumVertices := fn() {
    return this.vertices.count();
};

var polygon = new Polygon();
polygon.getNumVertices();
```

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Factorial: $n! = 1 \cdot 2 \cdot 3 \cdot \ldots \cdot n$ $0! = 1$

Implementation

```
var factorialRecursive = fn(Number n) {
    if(n == 0) {
        return 1;
    }
    return thisFn(n - 1) * n;
};
var factorialIterative = fn(Number n) {
    var product = 1;
    for(var i = 2; i <= n; ++i) {
        product *= i;
    }
    return product;
};
```

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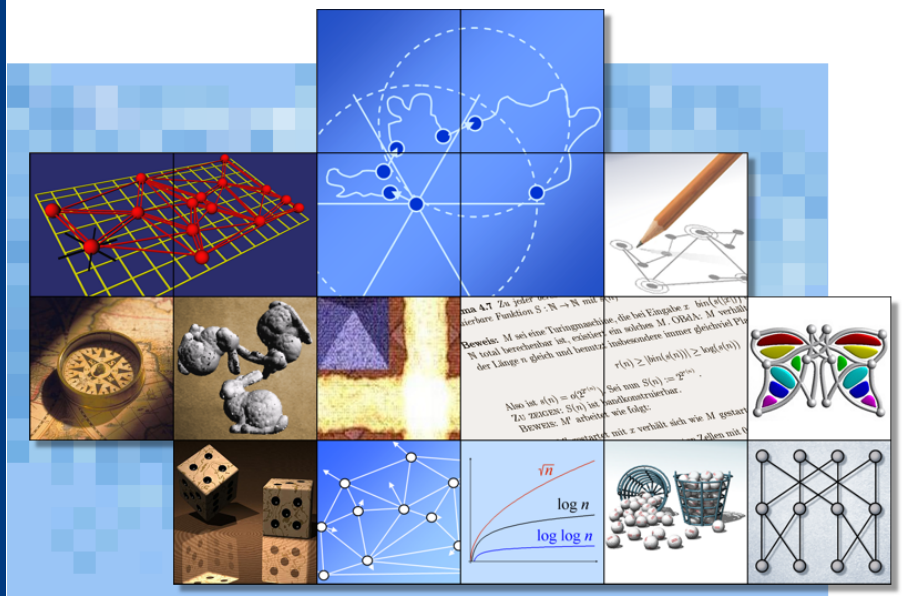
Implementation

```
var Player = new Type();
Player.x := 0;
Player.y := 0;
var movePlayer = fn(player, Number dx, Number dy) {
    player.x += dx;
    player.y += dy;
};
var printPos = fn(player) {
    out("Player position: (", player.x);
    out(", ", player.y, ")\n");
};

var playerA = new Player();
movePlayer(playerA, 5, 7);
printPos(playerA);
```

Thank you for your attention!



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