

Experiment: Die Türme von Hanoi



Links

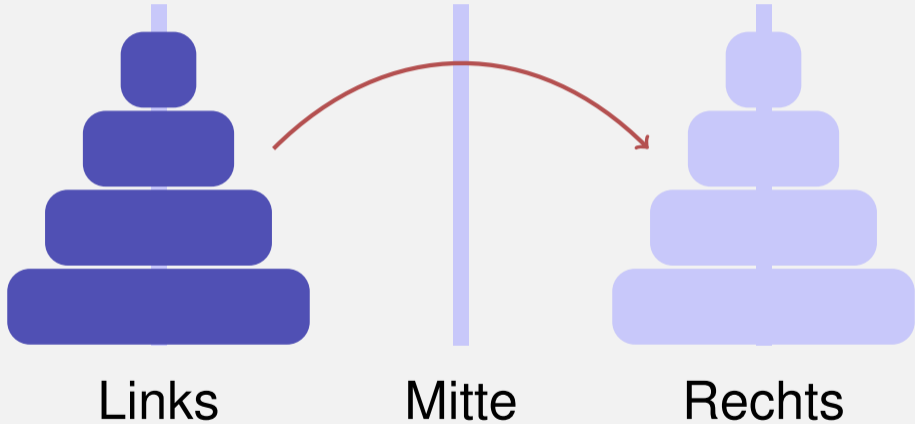


Mitte



Rechts

Experiment: Die Türme von Hanoi



Die Türme von Hanoi - So gehts!



Links



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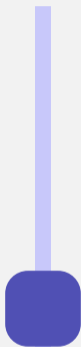


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Die Türme von Hanoi - So gehts!



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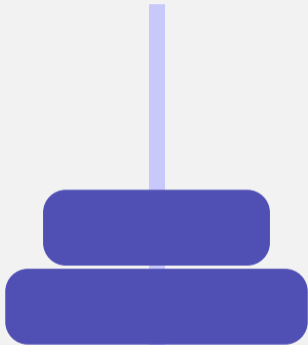


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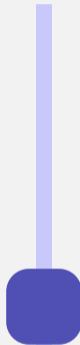


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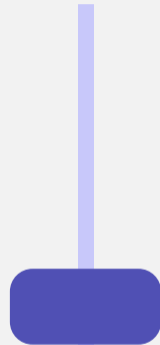
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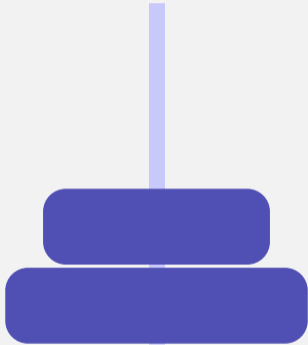


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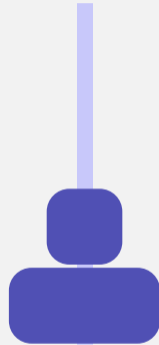
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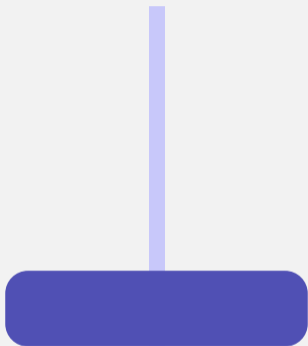


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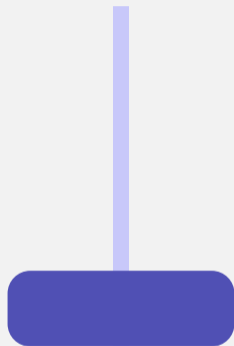


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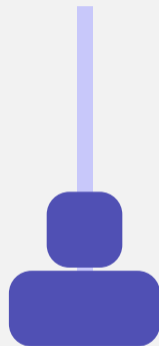
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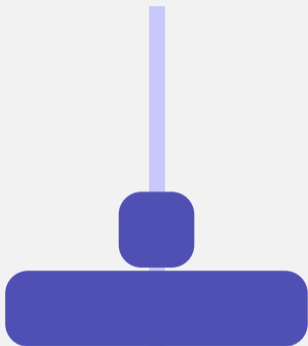


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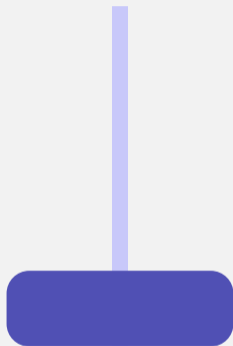


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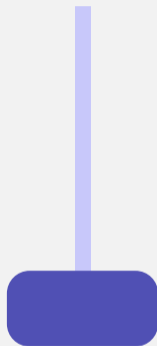
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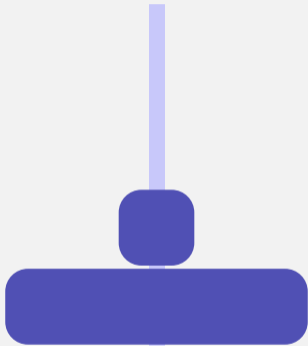


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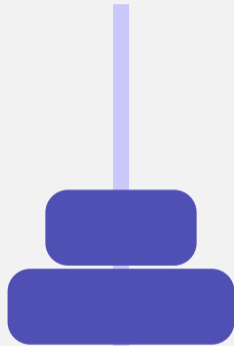


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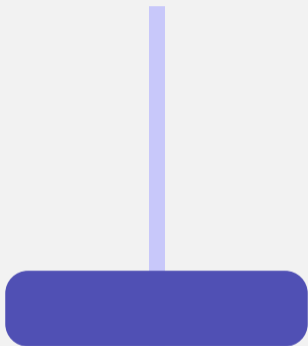


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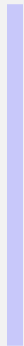


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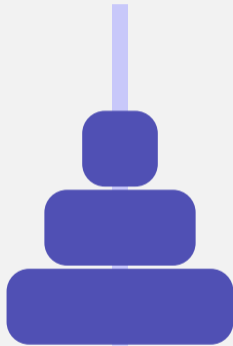


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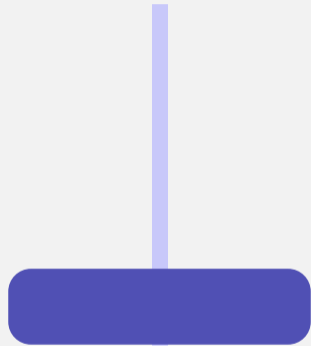
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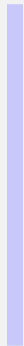


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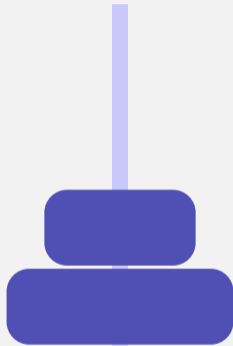


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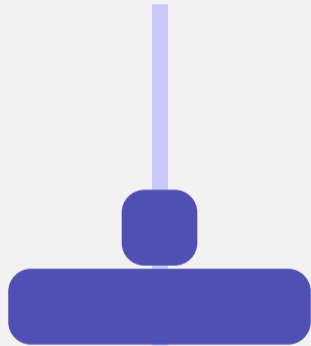
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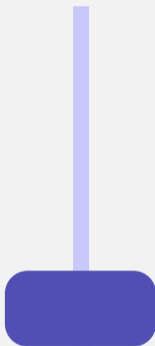


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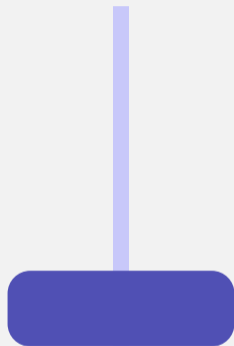


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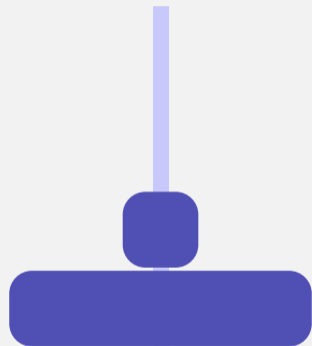
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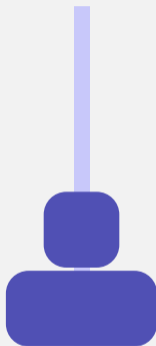


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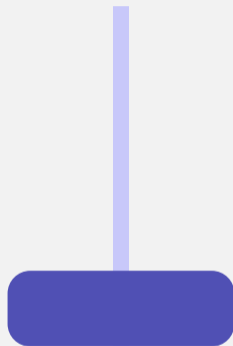


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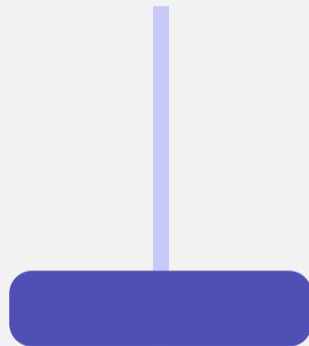
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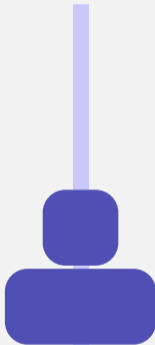


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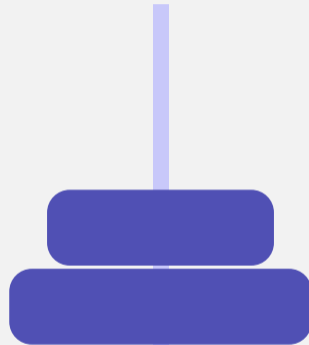
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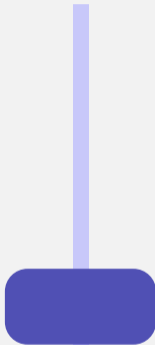


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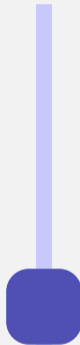


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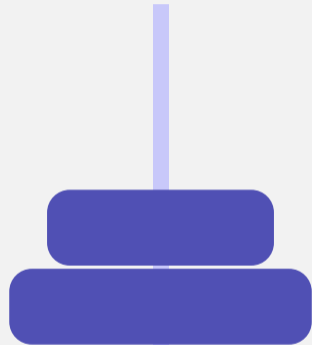
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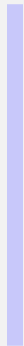


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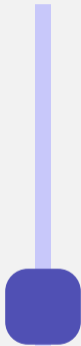


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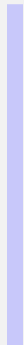


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Die Türme von Hanoi - So gehts!



Links



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Rechts

Die Türme von Hanoi - Rekursiver Lösungsansatz



Links



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Die Türme von Hanoi - Rekursiver Lösungsansatz



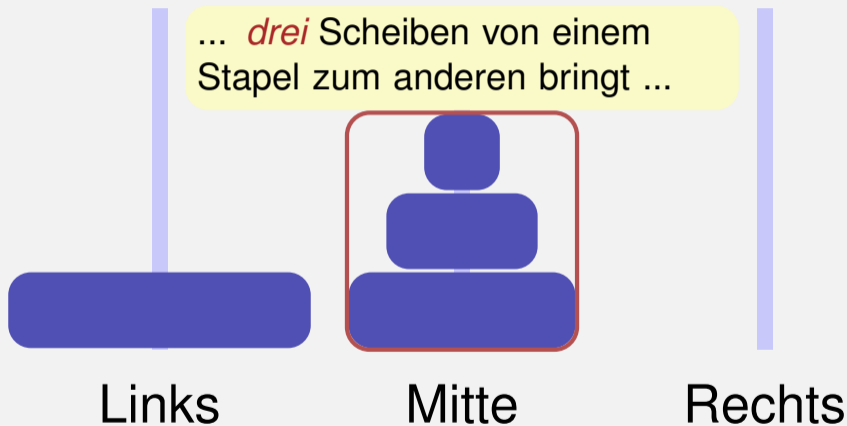
Mal *angenommen*, wir wüssten wie man ...

Links

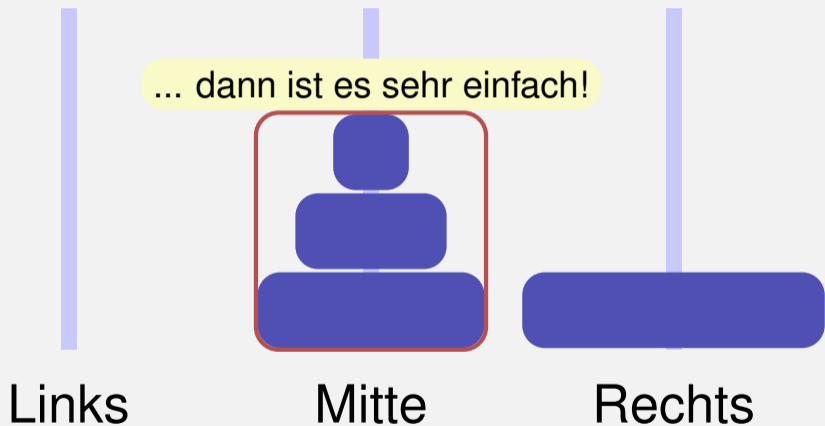
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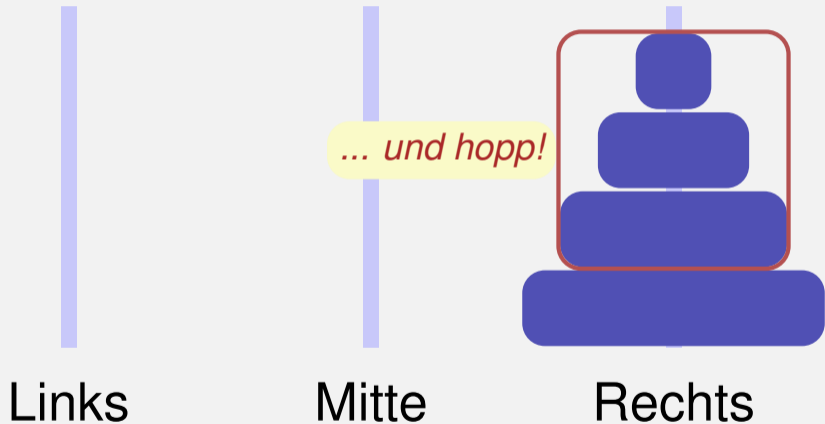
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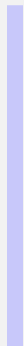
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Die Türme von Hanoi - Rekursiver Lösungsansatz



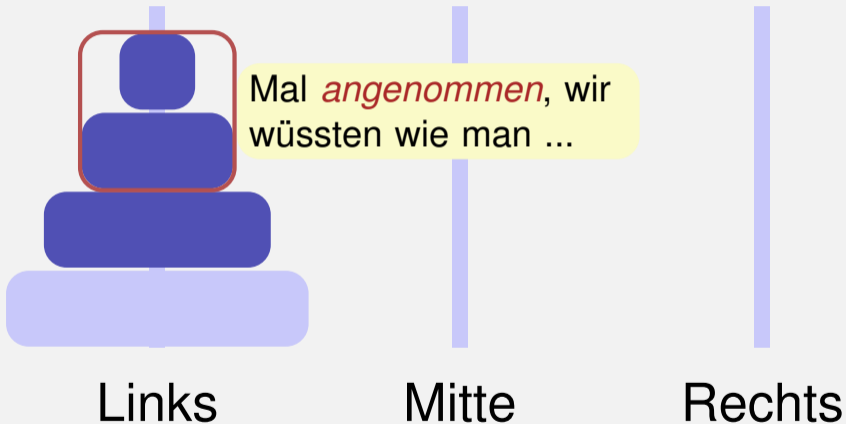
Doch *wie* können wir drei
Scheiben bewegen?

Links

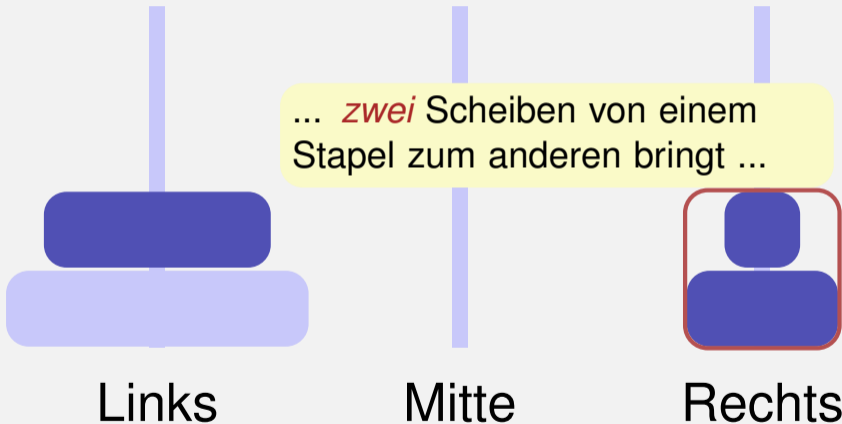
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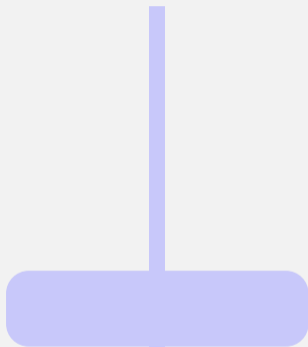
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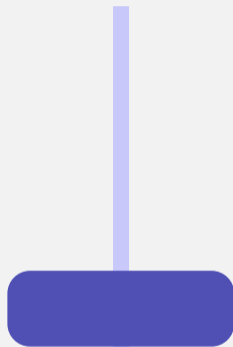
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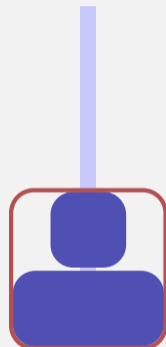
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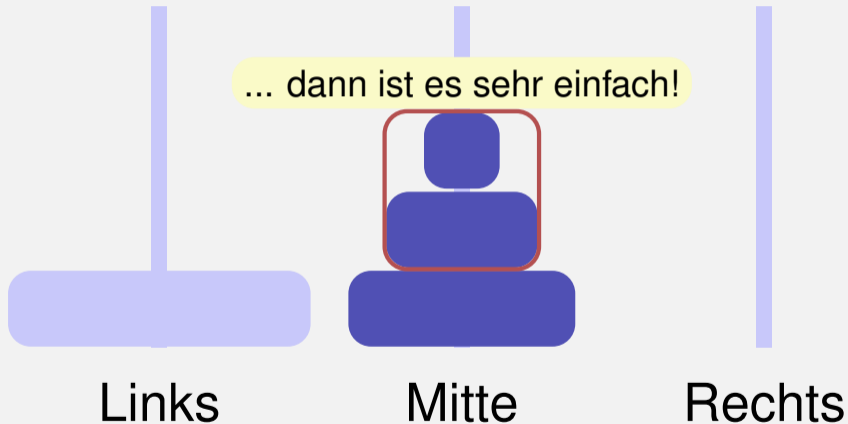


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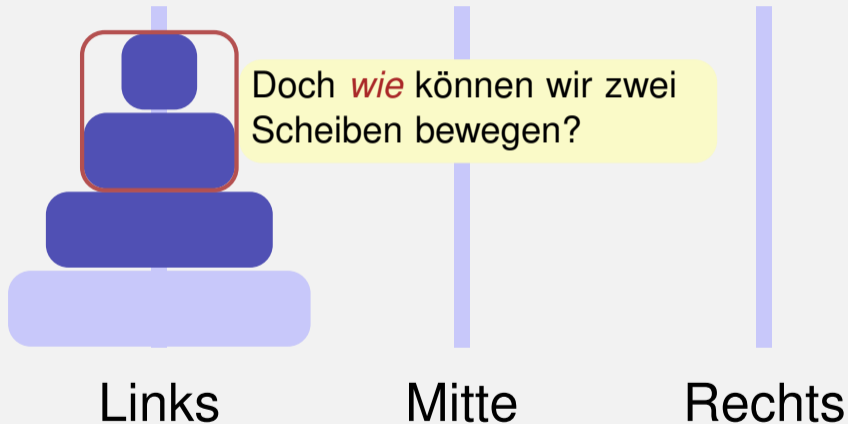


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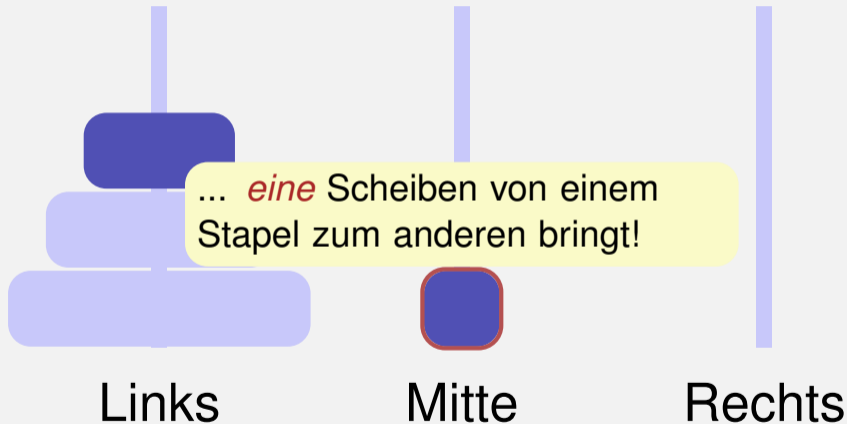
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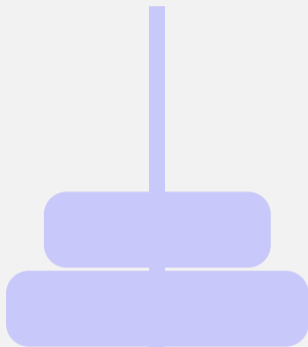
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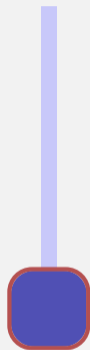
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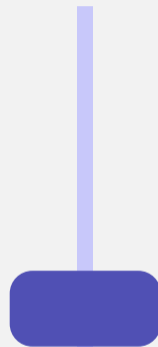
Die Türme von Hanoi - Rekursiver Lösungsansatz



Links



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Rechts

Die Türme von Hanoi - Rekursiver Lösungsansatz



Die Türme von Hanoi - Code



left

middle

right

Bewege 4 Scheiben von left nach right mit Hilfsstapel middle:

```
move(4, "left", "middle", "right")
```

Die Türme von Hanoi - Code

`move(n, src, aux, dst)` \Rightarrow

- 1 Bewege die obersten $n - 1$ Scheiben von *src* nach *aux* mit Hilfsstapel *dst*:
`move(n - 1, src, dst, aux);`
- 2 Bewege 1 Scheibe von *src* nach *dst*
`move(1, src, aux, dst);`
- 3 Bewege die obersten $n - 1$ Scheiben von *aux* nach *dst* mit Hilfsstapel *src*:
`move(n - 1, aux, src, dst);`

Die Türme von Hanoi - Code

```
void move(int n, const string &src, const string &aux, const string &dst){  
    if (n == 1) {  
        // base case ('move' the disc)  
        std::cout << src << " --> " << dst << std::endl;  
    } else {  
        // recursive case  
  
    }  
}
```

Die Türme von Hanoi - Code

```
void move(int n, const string &src, const string &aux, const string &dst){  
    if (n == 1) {  
        // base case ('move' the disc)  
        std::cout << src << " --> " << dst << std::endl;  
    } else {  
        // recursive case  
        move(n-1, src, dst, aux);  
  
    }  
}
```

Die Türme von Hanoi - Code

```
void move(int n, const string &src, const string &aux, const string &dst){
    if (n == 1) {
        // base case ('move' the disc)
        std::cout << src << " --> " << dst << std::endl;
    } else {
        // recursive case
        move(n-1, src, dst, aux);
        move(1, src, aux, dst);
    }
}
```

Die Türme von Hanoi - Code

```
void move(int n, const string &src, const string &aux, const string &dst){  
    if (n == 1) {  
        // base case ('move' the disc)  
        std::cout << src << " --> " << dst << std::endl;  
    } else {  
        // recursive case  
        move(n-1, src, dst, aux);  
        move(1, src, aux, dst);  
        move(n-1, aux, src, dst);  
    }  
}
```


Die Türme von Hanoi - Code

```
void move(int n, const string &src, const string &aux, const string &dst){
    if (n == 1) {
        // base case ('move' the disc)
        std::cout << src << " --> " << dst << std::endl;
    } else {
        // recursive case
        move(n-1, src, dst, aux);
        move(1, src, aux, dst);
        move(n-1, aux, src, dst);
    }
}

int main() {
    move(4, "left ", "middle", "right ");
    return 0;
}
```

Die Türme von Hanoi - Code Alternative

```
void move(int n, const string &src, const string &aux, const string &dst){  
    // base case  
    if (n == 0) return;  
  
    // recursive case  
    move(n-1, src, dst, aux);  
    std::cout << src << " --> " << dst << "\n";  
    move(n-1, aux, src, dst);  
}
```

```
int main() {  
    move(4, "left ", "middle", "right ");  
    return 0;  
}
```