

Über Bit-Frickeleien (und andere Vergnügen)

Michael Wiedeking
MATHEMA GmbH

Das Unvergnügliche



0

1

0	1	1	0
---	---	---	---

0	0	1	1
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0	1	0	1
---	---	---	---

0	0	0	0
0	0	0	1
0	0	1	0
0	0	1	1
0	1	0	0
0	1	0	1
0	1	1	0
0	1	1	1

x

0	0	1	1
---	---	---	---

y

0	1	0	1
---	---	---	---

1	0	0	0
1	0	0	1
1	0	1	0
1	0	1	1
1	1	0	0
1	1	0	1
1	1	1	0
1	1	1	1

0	0	0	0
0	0	0	1
0	0	1	0
0	0	1	1
0	1	0	0
0	1	0	1
0	1	1	0
0	1	1	1

x

0	0	1	1
---	---	---	---

y

0	1	0	1
---	---	---	---

1	0	0	0
1	0	0	1
1	0	1	0
1	0	1	1
1	1	0	0
1	1	0	1
1	1	1	0
1	1	1	1

0	0	0	1
---	---	---	---

x

0	0	1	1
---	---	---	---

0	1	0	1
---	---	---	---

y

1	1	1	0
---	---	---	---

$x \& y$ 0 0 0 1

x

0 0 1 1

0 1 0 1

y

1 1 1 0

$x \& y$ 0 0 0 1

x

0 0 1 1

0 1 0 1

y

1 1 1 0

$\sim(x \& y)$

$x \& y$ 0 0 0 1

x

0 0 1 1

0 1 0 1

y

1 1 1 0 $\text{nand}(x, y)$

0	0	0	0
0	0	0	1
0	0	1	0
0	0	1	1
0	1	0	0
0	1	0	1
0	1	1	0
0	1	1	1

x

0	0	1	1
---	---	---	---

y

0	1	0	1
---	---	---	---

1	0	0	0
1	0	0	1
1	0	1	0
1	0	1	1
1	1	0	0
1	1	0	1
1	1	1	0
1	1	1	1

1	0	0	0
---	---	---	---

x

0	0	1	1
---	---	---	---

0	1	0	1
---	---	---	---

y

0	1	1	1
---	---	---	---

1	0	0	0
---	---	---	---

x

0	0	1	1
---	---	---	---

0	1	0	1
---	---	---	---

y

$x \mid y$

0	1	1	1
---	---	---	---

1 0 0 0 $\sim(x \mid y)$

x

0 0 1 1

0 1 0 1

y

$x \mid y$

0 1 1 1

1 0 0 0 $\text{nor}(x, y)$

x

0 0 1 1

0 1 0 1

y

$x \mid y$

0 1 1 1

0	0	0	0
0	0	0	1
0	0	1	0
0	0	1	1
0	1	0	0
0	1	0	1
0	1	1	0
0	1	1	1

x

0	0	1	1
---	---	---	---

y

0	1	0	1
---	---	---	---

1	0	0	0
1	0	0	1
1	0	1	0
1	0	1	1
1	1	0	0
1	1	0	1
1	1	1	0
1	1	1	1

1	0	0	1
---	---	---	---

x

0	0	1	1
---	---	---	---

0	1	0	1
---	---	---	---

y

$x \wedge y$

0	1	1	0
---	---	---	---

$x \wedge y$

0 1 1 0

x

0 0 1 1

y

0 1 0 1

1 0 0 1

$\sim(x \wedge y)$

$x \wedge y$

0 1 1 0

x

0 0 1 1

y

0 1 0 1

1 0 0 1

$\sim x \wedge y$

$x \wedge y$

0 1 1 0

x

0 0 1 1

y

0 1 0 1

1 0 0 1

$x \wedge \sim y$

0	0	0	0	0		1	0	0	0	$\sim(x \mid y)$
$x \ \& \ y$	0	0	0	1		1	0	0	1	$\sim x \ ^\wedge \ y$
$x \ \& \ \sim y$	0	0	1	0	x	1	0	1	0	$\sim y$
x	0	0	1	1	0	0	1	1	$x \mid \sim y$	
$\sim x \ \& \ y$	0	1	0	0		1	0	1	1	$x \mid \sim y$
y	0	1	0	1	y	1	1	0	0	$\sim x$
$x \ ^\wedge \ y$	0	1	1	0	0	1	0	1	$\sim x \mid y$	
$x \mid y$	0	1	1	1		1	1	0	1	$\sim x \mid y$
						1	1	1	0	$\sim x \mid \sim y$
						1	1	1	1	~ 1

$\mathbb{0}$	0	0	0	0
and(x, y)	0	0	0	1
andNot(x, y)	0	0	1	0
<i>x</i>	0	0	1	1
andNot(y, x)	0	1	0	0
<i>y</i>	0	1	0	1
xor(x, y)	0	1	1	0
or(x, y)	0	1	1	1

<i>x</i>			
0	0	1	1
<i>y</i>			
0	1	0	1

1	0	0	0	nor(x, y)
1	0	0	1	xorNot(x, y)
1	0	1	0	not(y)
1	0	1	1	orNot(x, y)
1	1	0	0	not(x)
1	1	0	1	orNot(y, x)
1	1	1	0	nand(x, y)
1	1	1	1	$\mathbb{1}$

0

0	0	0	0
---	---	---	---

1

0	0	0	1
---	---	---	---

2

0	0	1	0
---	---	---	---

3

0	0	1	1
---	---	---	---

4

0	1	0	0
---	---	---	---

5

0	1	0	1
---	---	---	---

6

0	1	1	0
---	---	---	---

7

0	1	1	1
---	---	---	---

1	0	0	0
---	---	---	---

8

1	0	0	1
---	---	---	---

9

1	0	1	0
---	---	---	---

10

1	0	1	1
---	---	---	---

11

1	1	0	0
---	---	---	---

12

1	1	0	1
---	---	---	---

13

1	1	1	0
---	---	---	---

14

1	1	1	1
---	---	---	---

15

0

0	0	0	0
---	---	---	---

1

0	0	0	1
---	---	---	---

2

0	0	1	0
---	---	---	---

3

0	0	1	1
---	---	---	---

4

0	1	0	0
---	---	---	---

5

0	1	0	1
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6

0	1	1	0
---	---	---	---

7

0	1	1	1
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+

0	0	1	1
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0	1	0	1
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1	0	0	0
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8

1	0	0	1
---	---	---	---

9

1	0	1	0
---	---	---	---

10

1	0	1	1
---	---	---	---

11

1	1	0	0
---	---	---	---

12

1	1	0	1
---	---	---	---

13

1	1	1	0
---	---	---	---

14

1	1	1	1
---	---	---	---

15

0

0	0	0	0
---	---	---	---

1

0	0	0	1
---	---	---	---

2

0	0	1	0
---	---	---	---

3

0	0	1	1
---	---	---	---

4

0	1	0	0
---	---	---	---

5

0	1	0	1
---	---	---	---

6

0	1	1	0
---	---	---	---

7

0	1	1	1
---	---	---	---

$$\begin{array}{cccc}
 & & 0 & 0 & 1 & 1 \\
 + & & 0 & 1 & 0 & 1 \\
 \hline
 & & & & & 0
 \end{array}$$

1	0	0	0
---	---	---	---

8

1	0	0	1
---	---	---	---

9

1	0	1	0
---	---	---	---

10

1	0	1	1
---	---	---	---

11

1	1	0	0
---	---	---	---

12

1	1	0	1
---	---	---	---

13

1	1	1	0
---	---	---	---

14

1	1	1	1
---	---	---	---

15

0

0	0	0	0
---	---	---	---

1

0	0	0	1
---	---	---	---

2

0	0	1	0
---	---	---	---

3

0	0	1	1
---	---	---	---

4

0	1	0	0
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5

0	1	0	1
---	---	---	---

6

0	1	1	0
---	---	---	---

7

0	1	1	1
---	---	---	---

+

0	0	1	1
---	---	---	---

0	1	0	1
---	---	---	---

1 1

		0	0
--	--	---	---

1	0	0	0
---	---	---	---

8

1	0	0	1
---	---	---	---

9

1	0	1	0
---	---	---	---

10

1	0	1	1
---	---	---	---

11

1	1	0	0
---	---	---	---

12

1	1	0	1
---	---	---	---

13

1	1	1	0
---	---	---	---

14

1	1	1	1
---	---	---	---

15

0

0 0 0 0

1

0 0 0 1

2

0 0 1 0

3

0 0 1 1

4

0 1 0 0

5

0 1 0 1

6

0 1 1 0

7

0 1 1 1

$$\begin{array}{cccc}
 & & 0 & 0 & 1 & 1 \\
 & & \hline
 & + & 0 & 1 & 0 & 1 \\
 & & 1 & 1 & 1 & \\
 & & \hline
 & & 1 & 0 & 0 & 0
 \end{array}$$

1 0 0 0

8

1 0 0 1

9

1 0 1 0

10

1 0 1 1

11

1 1 0 0

12

1 1 0 1

13

1 1 1 0

14

1 1 1 1

15

0

0	0	0	0
---	---	---	---

1

0	0	0	1
---	---	---	---

2

0	0	1	0
---	---	---	---

3

0	0	1	1
---	---	---	---

4

0	1	0	0
---	---	---	---

5

0	1	0	1
---	---	---	---

6

0	1	1	0
---	---	---	---

7

0	1	1	1
---	---	---	---

1

1	0	0	0
---	---	---	---

1

1	0	0	1
---	---	---	---

1

1	0	1	0
---	---	---	---

1

1	0	1	1
---	---	---	---

1

1	1	0	0
---	---	---	---

1

1	1	0	1
---	---	---	---

1

1	1	1	0
---	---	---	---

1

1	1	1	1
---	---	---	---

0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1

1	0	0	0	-8
1	0	0	1	-7
1	0	1	0	-6
1	0	1	1	-5
1	1	0	0	-4
1	1	0	1	-3
1	1	1	0	-2
1	1	1	1	-1

$$-x = \sim x + 1$$

0

0	0	0	0
---	---	---	---

1

0	0	0	1
---	---	---	---

2

0	0	1	0
---	---	---	---

3

0	0	1	1
---	---	---	---

4

0	1	0	0
---	---	---	---

5

0	1	0	1
---	---	---	---

6

0	1	1	0
---	---	---	---

7

0	1	1	1
---	---	---	---

- 0 0 1 1

--	--	--	--

1	0	0	0
---	---	---	---

-8

1	0	0	1
---	---	---	---

-7

1	0	1	0
---	---	---	---

-6

1	0	1	1
---	---	---	---

-5

1	1	0	0
---	---	---	---

-4

1	1	0	1
---	---	---	---

-3

1	1	1	0
---	---	---	---

-2

1	1	1	1
---	---	---	---

-1

0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1

- 0 0 1 1

1 1 0 0

+ 0 0 0 1

1	0	0	0	-8
1	0	0	1	-7
1	0	1	0	-6
1	0	1	1	-5
1	1	0	0	-4
1	1	0	1	-3
1	1	1	0	-2
1	1	1	1	-1

0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1

- 0 0 1 1



1 1 0 0

+ 0 0 0 1



1 1 0 1

1	0	0	0	-8
1	0	0	1	-7
1	0	1	0	-6
1	0	1	1	-5
1	1	0	0	-4
1	1	0	1	-3
1	1	1	0	-2
1	1	1	1	-1

0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1

$$\begin{array}{r}
 - \quad 0 \ 0 \ 0 \ 0 \\
 \hline
 \quad 1 \ 1 \ 1 \ 1 \\
 + \quad 0 \ 0 \ 0 \ 1 \\
 \hline
 \quad 0 \ 0 \ 0 \ 0
 \end{array}$$

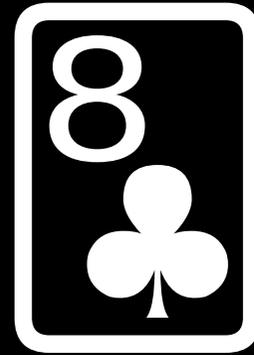
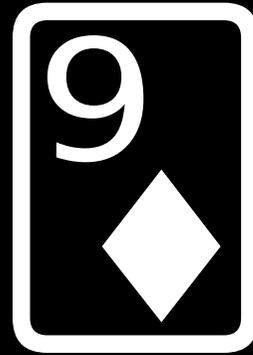
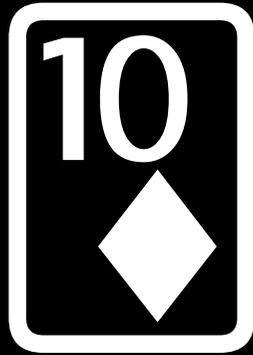
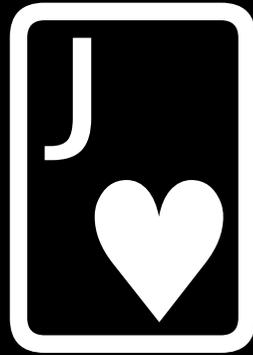
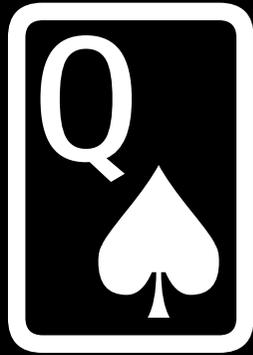
1	0	0	0	-8
1	0	0	1	-7
1	0	1	0	-6
1	0	1	1	-5
1	1	0	0	-4
1	1	0	1	-3
1	1	1	0	-2
1	1	1	1	-1

0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1

$$\begin{array}{r}
 - \quad 1 \ 0 \ 0 \ 0 \\
 \hline
 \quad 0 \ 1 \ 1 \ 1 \\
 + \quad 0 \ 0 \ 0 \ 1 \\
 \hline
 \quad 1 \ 0 \ 0 \ 0
 \end{array}$$

1	0	0	0	-8
1	0	0	1	-7
1	0	1	0	-6
1	0	1	1	-5
1	1	0	0	-4
1	1	0	1	-3
1	1	1	0	-2
1	1	1	1	-1

Das Vergnügliche



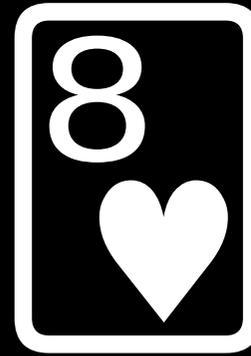
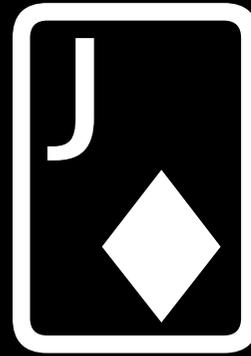
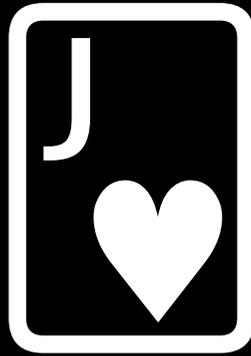
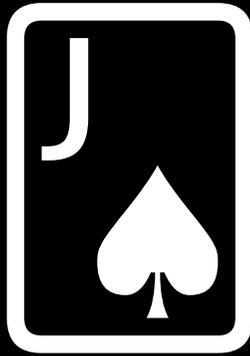
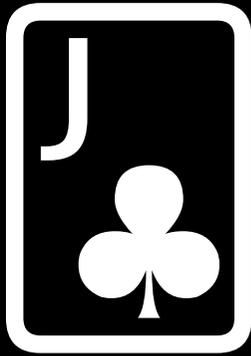
```
public static boolean differentRanks(Hand hand) {  
    return hand.stream().allMatch(  
        card -> hand.stream()  
            .filter(c -> c != card)  
            .allMatch(c -> c.rank != card.rank)  
    );  
}
```

```
public static boolean straightOrder(Hand hand) {  
    return hand.stream()  
        .anyMatch(  
            card -> hand.stream()  
                .filter(c -> c != card)  
                .allMatch(  
                    c -> hand.stream()  
                        .anyMatch(cc -> cc.rank.succ() == c.rank)  
                )  
        )  
    ;  
}
```

```
public static boolean differentRanks(Hand hand) {  
    return hand.stream()  
        .collect(Collectors.groupingBy(c -> c.rank))  
        .size() == 5  
    ;  
}
```



0	0	1	0
---	---	---	---



A

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10

9

8

7

0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0	0	1	1	0	1	1	0
---	---	---	---	---	---	---	---

0	0	1	1	0	1	1	0
---	---	---	---	---	---	---	---

0 0 1 1 0 1 1 0

$$x' = x \& 0x55$$

0	0	1	1	0	1	1	0
---	---	---	---	---	---	---	---

0	1	0	1	0	1	0	1
---	---	---	---	---	---	---	---

0	0	0	1	0	1	0	0
---	---	---	---	---	---	---	---

$$x'' = (x \& 0xAA) \ggg 1$$

0	0	1	1	0	1	1	0
---	---	---	---	---	---	---	---

1	0	1	0	1	0	1	0
---	---	---	---	---	---	---	---

0	0	1	0	0	0	1	0
---	---	---	---	---	---	---	---

$$x' = x \& 0x55$$

0	0	1	1	0	1	1	0
---	---	---	---	---	---	---	---

0	1	0	1	0	1	0	1
---	---	---	---	---	---	---	---

0	0	0	1	0	1	0	0
---	---	---	---	---	---	---	---

$$x'' = (x \ggg 1) \& 0x55$$

0	0	1	1	0	1	1	0
---	---	---	---	---	---	---	---

0	1	0	1	0	1	0	1
---	---	---	---	---	---	---	---

0	0	0	1	0	0	0	1
---	---	---	---	---	---	---	---

$$x = x' + x''$$

0	0	1	1	0	1	1	0
---	---	---	---	---	---	---	---

0	0	0	1	0	1	0	0
---	---	---	---	---	---	---	---

0	0	0	1	0	0	0	1
---	---	---	---	---	---	---	---

0	0	1	0	0	1	0	1
---	---	---	---	---	---	---	---

0 0 1 1 0 1 1 0

0 0 1 0 0 1 0 1
0 2 1 1

0	0	1	0	0	1	0	1
---	---	---	---	---	---	---	---

$$x' = x \& 0x33$$

0	0	1	0	0	1	0	1
---	---	---	---	---	---	---	---

0	0	1	1	0	0	1	1
---	---	---	---	---	---	---	---

0	0	1	0	0	0	0	1
---	---	---	---	---	---	---	---

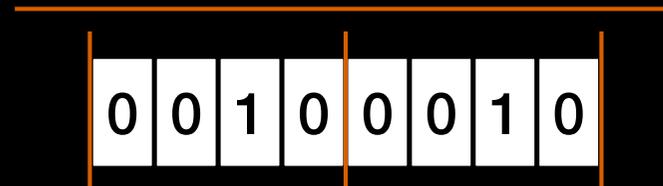
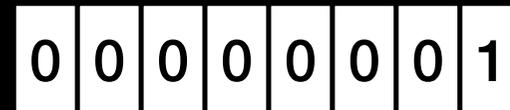
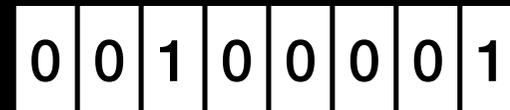
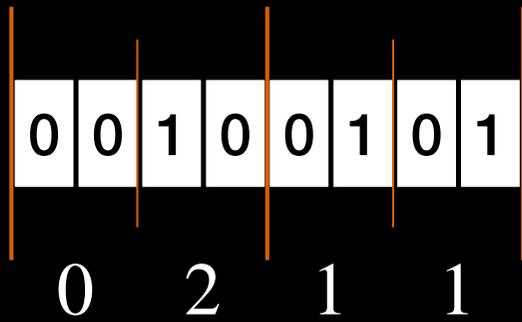
$$x'' = (x \ggg 2) \& 0x33$$

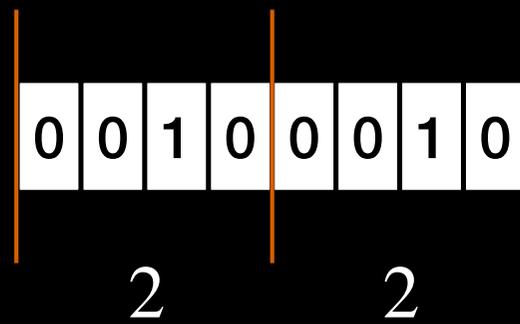
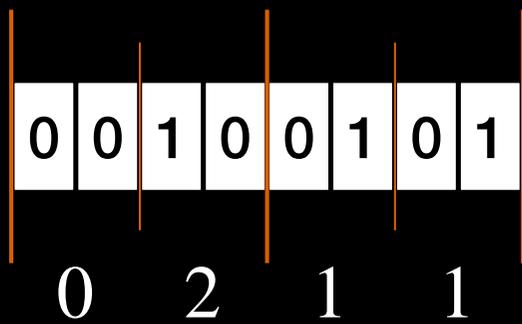
0	0	1	0	0	1	0	1
---	---	---	---	---	---	---	---

0	0	1	1	0	0	1	1
---	---	---	---	---	---	---	---

0	0	0	0	0	0	0	1
---	---	---	---	---	---	---	---

$$x = x' + x''$$





0	0	1	0	0	0	1	0
---	---	---	---	---	---	---	---

$$x' = x \& 0x0F$$

0	0	1	0	0	0	1	0
---	---	---	---	---	---	---	---

0	0	0	0	1	1	1	1
---	---	---	---	---	---	---	---

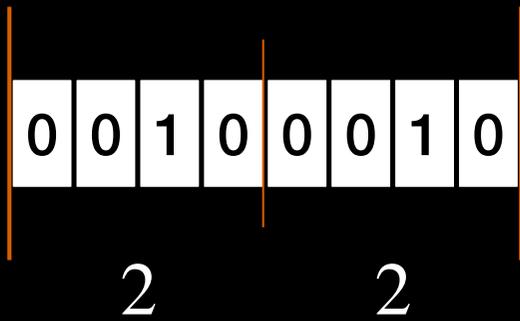
0	0	0	0	0	0	1	0
---	---	---	---	---	---	---	---

$$x'' = (x \ggg 4) \& 0x0F$$

0	0	1	0	0	0	1	0
---	---	---	---	---	---	---	---

0	0	0	0	1	1	1	1
---	---	---	---	---	---	---	---

0	0	0	0	0	0	1	0
---	---	---	---	---	---	---	---

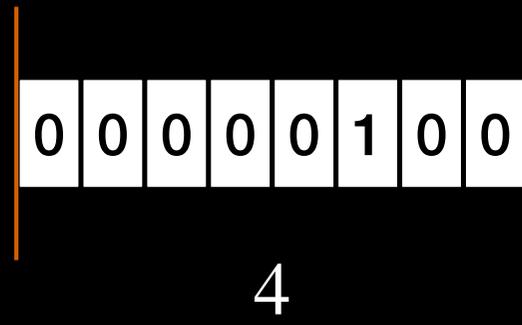
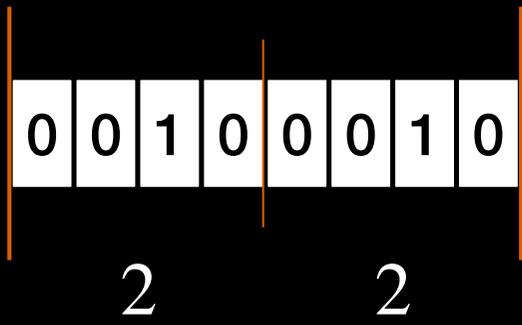


$$x = x' + x''$$

0 0 0 0 0 0 1 0

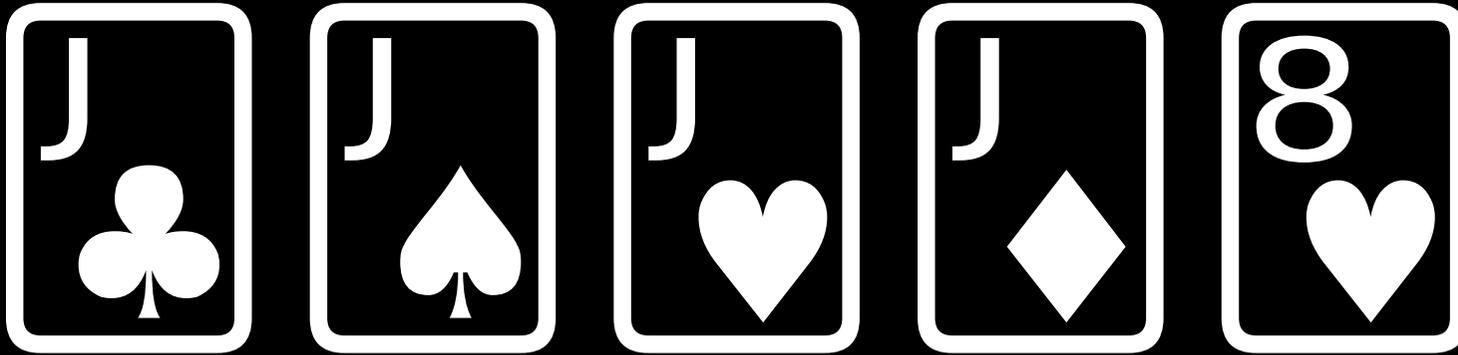
0 0 0 0 0 0 1 0

0 0 0 0 0 1 0 0



```
private static int rankCount(int cards) {  
    int sum = cards;  
    sum    = (sum & 0x55555555)  
            + ((sum >>> 1) & 0x55555555);  
    sum    = (sum & 0x33333333)  
            + ((sum >>> 2) & 0x33333333);  
    return sum;  
}
```

```
private static long rankCount(long cards) {  
    long sum = cards;  
    sum    = (sum & 0x555_55555_55555L)  
            + ((sum >>> 1) & 0x555_55555_55555L);  
    sum    = (sum & 0x333_33333_33333L)  
            + ((sum >>> 2) & 0x333_33333_33333L);  
    return sum;  
}
```



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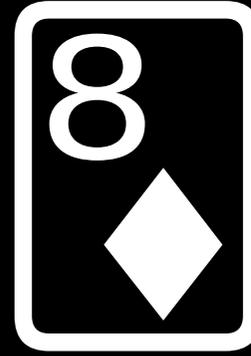
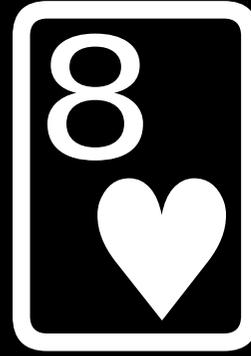
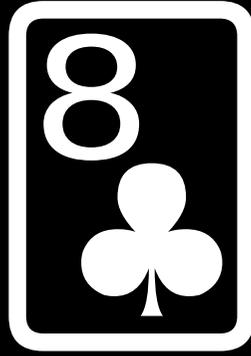
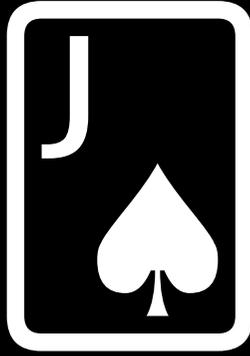
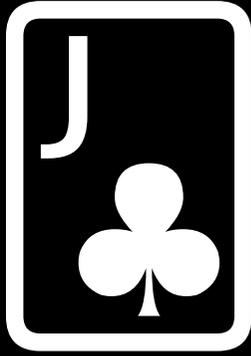
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0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---



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0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

$$x \& (x \ll 1) \neq 0$$

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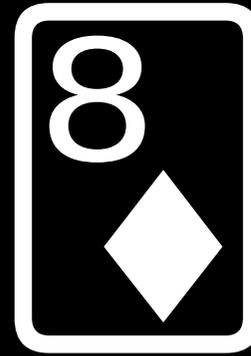
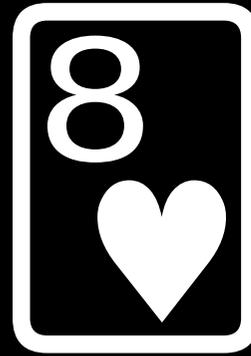
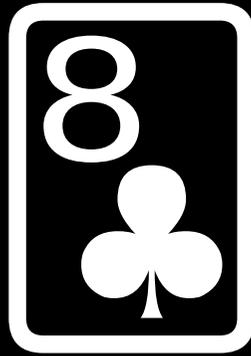
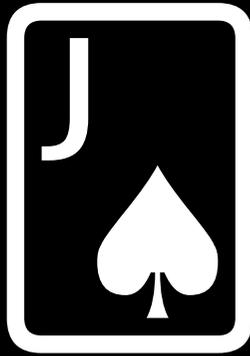
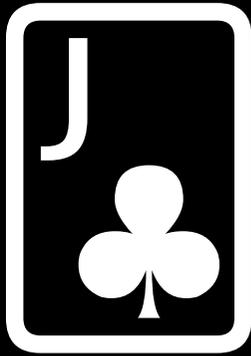
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---



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0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

$$x = x \wedge 0x11111111$$

$$x \& (x \ll 1) \neq 0$$

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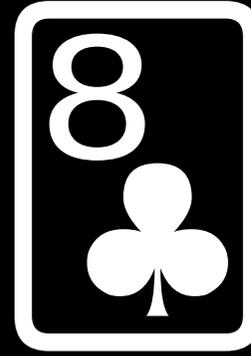
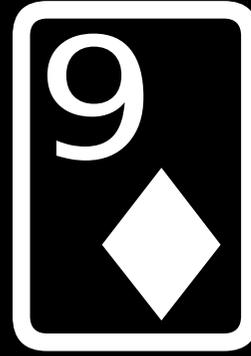
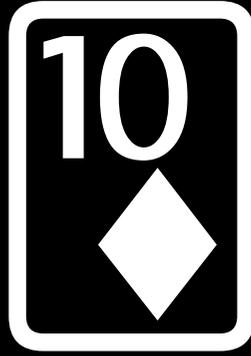
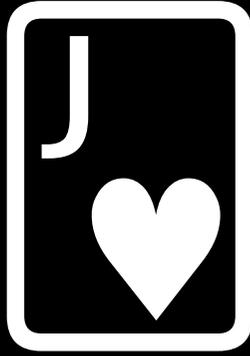
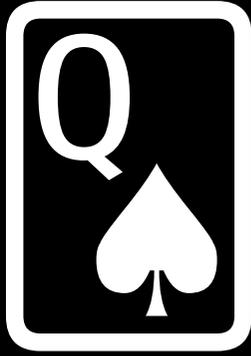
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0	0	0	1	0	0	0	1	0	0	0	1	0	0	1	1	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0	0	1	0	0	0	0	1	0	0	0	1	0	0	1	1	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---



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0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	1	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

$$x \ \& \ 0b0001 \ == \ x$$

0 0 0 0

0 0 0 1

0 0 1 0

0 0 1 1

0 1 0 0

0 0 0 1

0 0 0 1

0 0 0 1

0 0 0 1

0 0 0 1

0 0 0 0

0 0 0 1

0 0 0 0

0 0 0 1

0 0 0 0

$$x \ \& \ 0b0001 \ == \ x$$

0	0	0	0
---	---	---	---

0	0	0	1
---	---	---	---

0	0	1	0
---	---	---	---

0	0	1	1
---	---	---	---

0	1	0	0
---	---	---	---

0	0	0	0
---	---	---	---

0	0	0	1
---	---	---	---

0	0	0	0
---	---	---	---

0	0	0	1
---	---	---	---

0	0	0	0
---	---	---	---

$$x \ \& \ 0x11111111 \ == \ x$$

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0 0 0 0 | 0 0 0 0 | 0 1 0 0 | 0 0 1 0 | 0 0 0 1 | 0 0 0 1 | 1 0 0 0 | 0 0 1 0

0

0

1

1

1

1

1

0

0 0 0 0 | 0 0 0 0 | 0 0 0 1 | 0 0 0 1 | 0 0 0 1 | 0 0 0 1 | 0 0 0 1 | 0 0 0 0

0 0 0 1 | 0 0 0 1 | 0 0 0 1 | 0 0 0 1 | 0 0 0 1 | 0 0 0 1 | 0 0 0 1 | 0 0 0 1

0 0 0 0 | 0 0 0 0 | 0 0 0 1 | 0 0 0 1 | 0 0 0 1 | 0 0 0 1 | 0 0 0 1 | 0 0 0 0

$$x \ \& \ 0x11111111 \ == \ x$$

A

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0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	1	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0

1

0

1

1

1

1

0

0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

$$x = x + (x \ggg 4) + (x \ggg 8) + (x \ggg 12) + (x \ggg 16)$$

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0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	1	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	1	0	1	0	0	0	1	0	1	0	1	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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$$x = x + (x \ggg 4) + (x \ggg 8) + (x \ggg 12) + (x \ggg 16)$$

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0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	1	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	1	1	0	1	0	0	0	1	0	0	0	0	1	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

1

2

2

3

4

4

3

$((x \& 0x11111111) \ll 2) \& x \neq 0$

0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	1	0	1	0	0	0	1	0	1	0	1	0	0	0	
											1				2					3									5				4

$$((x \& 0x11111111) \ll 2) \& x \neq 0$$

0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	1	0	1	0	0	0	1	0	1	0	1	0	0
								1	2		3		4		5		4														

0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

$((x \& 0x11111111) \ll 2) \& x \neq 0$

1

2

3

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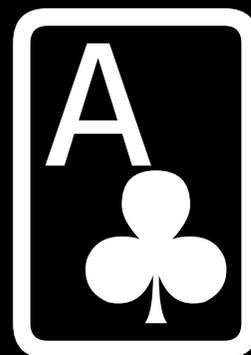
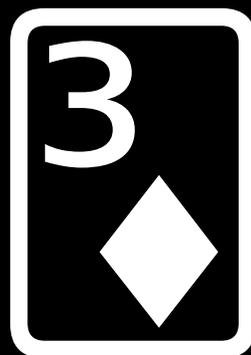
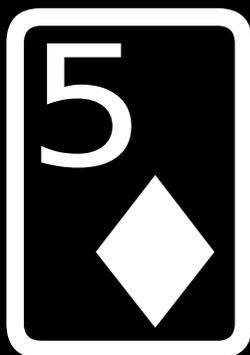
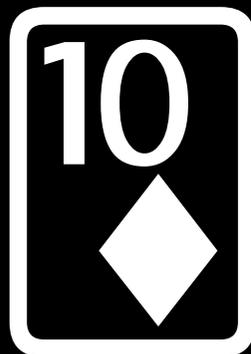
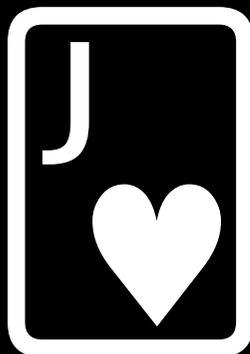
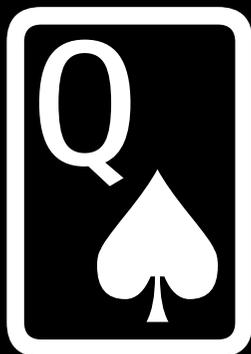
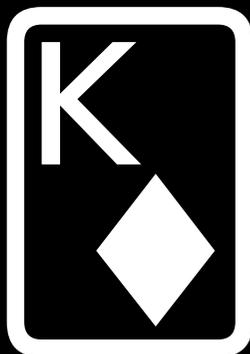
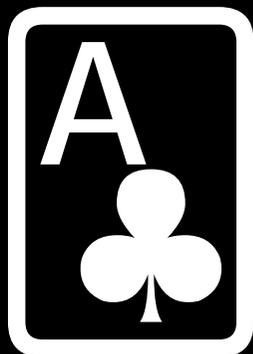
5

4

0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	1	0	1	0	0	0	1	0	1	0	1	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---



A K Q J 10 9 8 7 6 5 4 3 2 A

00000000000100000000000000000000000000000000000100001000010000100001

1 1 1 1 1 0 0 0 0 1 2 3 4 5

Vielen Dank!

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
1F0A0																	
1F0B0																	
1F0C0																	
1F0D0																	

```
private static int map(int i) {  
    return i * 13 / 12;  
}
```

J F M A M J J A S O N D

31 28 31 30 31 30 31 31 30 31 30 31

31 28 31 30 31 30 31 31 30 31 30 31

31 30 31 30 31 31 30 31 30 31 31 28

31 30 31 30 31 31 30 31 30 31 31 28

31 30 31 30 31 31 30 31 30 31 31 28

```
Unicode.toString(  
    0x1F0A0 + ((i % 4) * 16) + map((i / 4) + 1)  
)
```

```
private static int map(int i) {  
    // return  $i * 13 / 12$ ;  
    return (( $i * 0x22AAF$ ) >>> 17);  
}
```

```
int suitOffset = (i % 4) * 16;  
int rankOffset = (i / 4) + 1;  
Unicode.toString(  
    0x1F0A0 + suitOffset + map(rankOffset)  
)
```

```
int suitOffset = (i & 0x3) << 4; // (i % 4) * 16
int rankOffset = (i >> 2) + 1; // (i / 4) + 1
Unicode.toString(
    0x1F0A0 + suitOffset + map(rankOffset)
)
```

Jetzt aber:

Vielen Dank!