

		$J = j$								
		1	2	3	4	5	6	7	8	9
$I = 1$	1	shaded			shaded			shaded		
	2									
	3									
$I = 4$	4	shaded			shaded			shaded		
	5									
$I = 6$	6				X					
	7	shaded			shaded			shaded		
	8									
	9									

Anchor cell for

How do we get  $(I, J)$  from  $(i, j)$   
 want  $I = f(i), J = f(j)$

- $f(1) = 1$        $f(4) = 4$        $f(7) = 7$
- $f(2) = 1$        $f(5) = 4$        $f(8) = 7$
- $f(3) = 1$        $f(6) = 4$        $f(9) = 7$

Some possibilities:

```

int f(int a) {
  if (1 <= a && a <= 3) return 1;
  if (4 <= a && a <= 6) return 4;
  if (7 <= a && a <= 9) return 7;
  else return 0;
}

```

```

int f(int a) {
  if (a <= 3) return 1;
  else if (a <= 6) return 4;
  else return 7;
}

```

```
int f(int a) {  
    return a - ((a-1)%3);  
}
```

a	a-1	(a-1)%3	a - ((a-1)%3)
1	0	0	1
2	1	1	1
3	2	2	1
4	3	0	4
5	4	1	4
6	5	2	4
7	6	0	7
8	7	1	7
9	8	2	7

int f(int a) {

return 3 \* ((a-1)/3) + 1 ;

}

a	a-1	(a-1)/3	3 * ((a-1)/3)	
1	0	0	0	1
2	1	0	0	1
3	2	0	0	1
4	3	1	3	4
5	4	1	3	4
6	5	1	3	4
7	6	2	6	7
8	7	2	6	7
9	8	2	6	7

Now to traverse box containing cell (i, j)

I = f(i);

J = f(j);

```

for (s = I; s <= I + 2; s++) {
  for (t = J; t <= J + 2; t++) {
    if ( ((s != i) || (t != j)) ..... ) {
      // do something with
      // A[s][t][...]
      ...
    }
  }
}

```

Ex Rational.java

equals:  $\frac{a}{b} = \frac{c}{d}$  iff  $a = c$   
and  $b = d$

compareTo:  $\frac{a}{b} < \frac{c}{d}$   
 $ad < bc$   
 $ad - bc < 0$

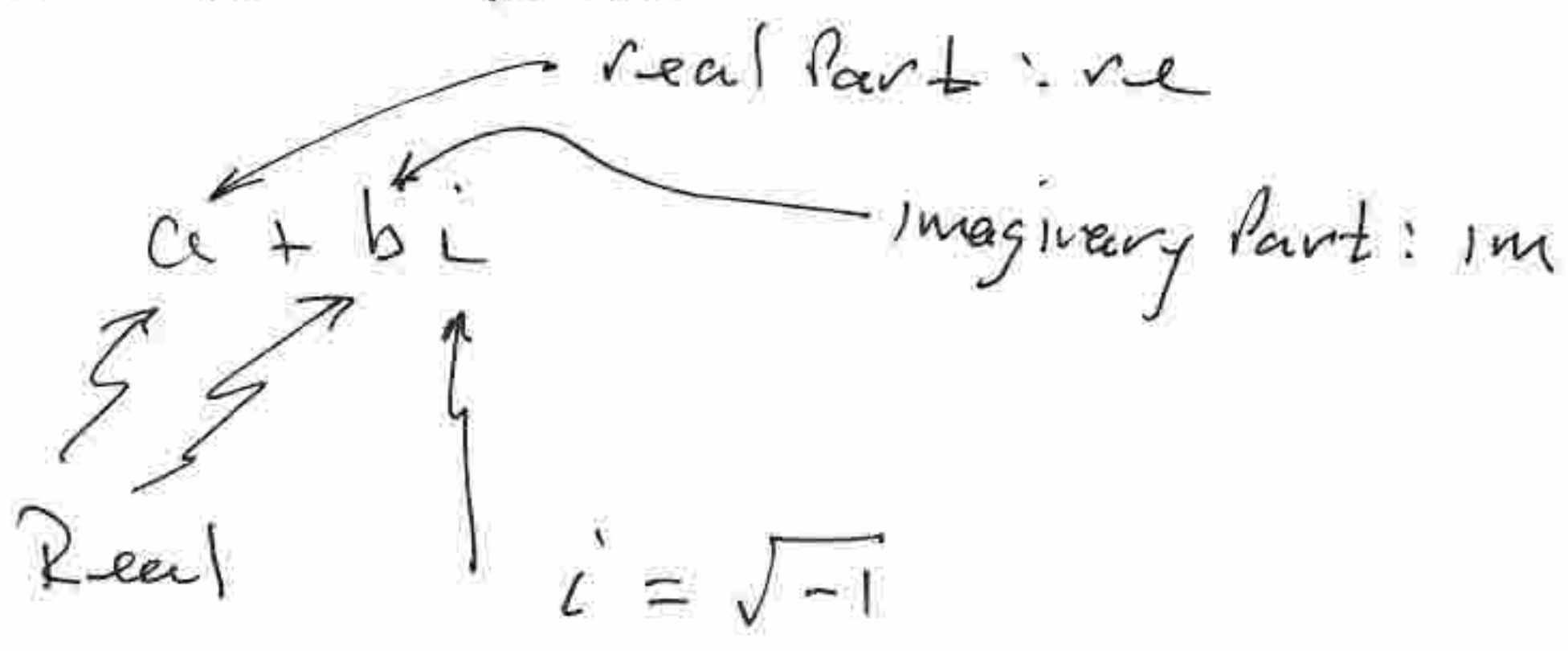
add:  $\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$

sub:  $\frac{a}{b} - \frac{c}{d} = \frac{ad - bc}{bd}$



Ex.

Complex - Java



i.e.  $i^2 = -1$

Exercise: fill in blanks.