

# IRanges Cheat Sheet

## IRanges Objects

*These commands both create the same ranges:*

```
x <- IRanges(start=4:10, end=13:19)
y <- IRanges(start=4:10, width=10)
```

*Naming and indexing ranges:*

```
names(x) <- letters[1:7]
x[2:3]
x[c('a', 'c')]
x[start(x) > 6]
```

*Accessing elements of IRanges objects:*

```
start(x)
end(x)
width(x)
range(x)
```

## Transformations

*Expand/shrink ranges by 4 bp on either side:*

```
x + 4
x - 4
```

*Restrict ranges to the interval [5,14]:*

```
restrict(x, 5, 14)
```

*Return flanking regions of length 5:*

```
flank(x, 5)
```

*Return run-length encoded coverage:*

```
cvg <- coverage(sbj)
# get run lengths
runLength(cvg)
# get run length values
runValue(cvg)
```

## Set Operations

```
A ∩ B: intersect(a, b)
A ∪ B: union(a, b)
A ∖ B: setdiff(a, b)
```

*Summary of regions covered by x:*

```
reduce(x)
```

*Summary of gaps in the regions covered by x:*

```
gaps(x)
```

*Pairwise set operations:*

```
pintersect(x, y)
punion(x, y)
psetdiff(x, y)
pgaps(x, y)
```

## Views

*View showing ranges with > 2x coverage:*

```
view2x <- coverage(sqs) %>%
  slice(lower = 2)
```

*View splitting up sqs into 20 bp windows:*

```
windows <- IRanges(seq(1, 520, 20),
  width = 20)
view20bp <- coverage(sqs) %>%
  Views(windows)
```

*Get statistics of each range:*

```
# mean coverage of each range
viewMeans(view2x)
# max/min coverage of each range
viewMaxs(view2x)
viewMins(view2x)
# median coverage of each range
viewApply(view2x, median)
```

## Overlaps, neighbors, coverage

*Creating a query:*

```
qry <- IRanges(4, 10)
sbj <- IRanges(c(6,11,3), c(11,18,12))
names(sbj) <- letters[1:3]
```

*Find overlaps of ranges in subjects, sbj, with ranges in the query, qry:*

```
# sbj 1, 3 overlap qry
hits <- findOverlaps(qry, sbj)
# only sbj 3 wholly contains qry
hits <- findOverlaps(qry, sbj,
  type = 'within')

# count sbj hits
countSubjectHits(hits) %>%
  setNames(names(sbj))
```

```
# pull overlapping ranges from hits
ranges(hits, qry, sbj)
```

*Find nearest neighboring ranges:*

*# code to test the next code chunk.*

*Don't include in document.*

```
qry <- IRanges(8, 10)
sbj <- IRanges(c(1,11,13), c(3,18,21))
# qry most closely precedes:
precede(qry, sbj)
# qry most closely follows:
follow(qry, sbj)
# qry is nearest to:
nearest(qry, sbj)
# distance to nearest range:
distanceToNearest(qry, sbj)
# all distances
distance(qry, sbj)
```