Breakdancer

**BreakDancer-1.1,** released under GPLv3, is a Perl/C++ package that provides genome-wide detection of structural variants from next generation paired-end sequencing reads. It includes two complementary programs.

BreakDancerMax predicts five types of structural variants: insertions, deletions, inversions, inter- and intra-chromosomal translocations from next-generation short paired-end sequencing reads using read pairs that are mapped with unexpected separation distances or orientation.

**Installation Notes**

Breakdancer requires sudo access due to installing the required perl modules.

**Getting Breakdancer**

```shell
sudo apt-get install subversion
svn co https://breakdancer.svn.sourceforge.net/svnroot/breakdancer
cd breakdancer
```

**Getting Samtools-0.1.6**

```shell
wget http://sourceforge.net/projects/samtools/files/samtools/0.1.6/samtools-0.1.6.tar.bz2
tar xjf samtools-0.1.6.tar.bz2
cd samtools-0.1.6
make
```

Should you receive an error when making and are on an Ubuntu/Linux system try changing the following line in Makefile:

```
samtools:lib $(AOBJS)
    $(CC) $(CFLAGS) -o @ $(AOBJ) -lm $(LIBPATH) $(LIBCURSES)
-lz -L. -lbam
```

to

```
samtools:lib $(AOBJ)
    $(CC) $(CFLAGS) -o @ $(AOBJ) -lm $(LIBPATH) $(LIBCURSES)
-L. -lbam -lz
```

And running ‘make’ again.

It is now assumed that you are in the breakdancer directory, inside it you’ve placed a samtools-0.1.6 directory and have compiled the samtools directory
Alter Breakdancer’s Makefile

Change the following line in Makefile:

```plaintext
all:
g++ -g -Wall -O2 -I/Users/kchen/samtools/samtools-0.1.6 BreakDancerMax.cpp AlnParser.cpp Poisson.cpp -o breakdancer-max -lm -lz -L/Users/kchen/samtools/samtools-0.1.6 -lbam
```

to

```plaintext
all:
g++ -g -Wall -O2 -I samtools-0.1.6/BreakDancerMax.cpp AlnParser.cpp Poisson.cpp -o breakdancer_max -lm -L samtools-0.1.6/ -lbam -lz
```

Changing both the path of the -I and -L flag and also moving the -lz library flag after -lbam

Congrats! You’ve, hopefully, installed the CPP portion of Breakdancer. But there is also a Perl script that Breakdancer must run so we need to handle the prerequisites for that.

Prerequisites for bam2cfg.pl

Change the shebang/header in the bam2cfg.pl from:

```plaintext
#!/gsc/bin/perl
```

to

```plaintext
#!/usr/bin/env perl
```

Install the required perl modules.

```plaintext
sudo cpan install Math::CDF
sudo cpan install Statistics::Descriptive
sudo cpan install GD::Graph
sudo cpan install GD::Graph::histogram
```

Running Breakdancer

For sanity just update you PATH environmental variable to include looking into the breakdancer directory for bam2cfg.pl and breakdancer_max.