Task for JAVA / JavaScript GUI Developer

We have a typical client – server product, with the client currently implemented in JavaScript in a browser, communicating with a SPRING back end essentially via JSON.

Our application has both a data management aspect (that makes use of a JAVA applet as well to handle file upload) and a data visualization aspect.

We want the whole interface to be elegant, ergonomic and responsive as well as maintainable. In order to achieve this we are considering a move to JAVAFX from JavaScript, in order to simplify integration with our clients and to be able to do more processing on the client side, while simplifying maintenance and testing (everything in JAVA).

Currently we need to re-organise the visualization page, shown below in Figure 1, so that:

1. The view is not so crowded, while still delivering a lot of data to the user.
2. The image and the zoomed image window of the circular plot are replaced with an interactive, dynamically generated display.

The image is called a circos plot, and is produced by open source software available here:
http://circos.ca/

Below in Figure 2 is a sample plot. The configuration file and the data to produce this can be downloaded from
https://www.dropbox.com/s/parye341eaaybah/circosExample.tar.gz

This also contains the full size png and svg versions of the image – (if you install circos you could reproduce this with the configuration file with the command `perl ../../circos-0.63-4/bin/circos -noparanoid --conf circos.conf`).

On a typical laptop it takes around 10s to create this – the image (png or svg) is around 1MB whereas the data necessary is < 30KB compressed – *a significant difference to pass over the network*.

The circos program is written in perl, and uses the gd library to handle the graphics. Currently we produce a high-resolution image and send it to the browser, where it is resized and displayed, with a zoom window showing detail. Clicking on a row in the table highlights a particular feature on the circos plot, and clicking on a feature in the circos plot highlights a particular row in the table. The user can move the grey square around to change the location of the zoomed window.

We only need a subset of the functionality of circos so we want to re-write this for the front end in JAVA (JAVAFX) – either directly drawing or via SVG. (Note there are various JavaScript libraries that do similar things in SVG eg. http://d3js.org/).

The advantage of this is that we can modify dynamically what is visible, and modify the details shown based on the resolution of the image in the window (no point drawing things that will not be visible).

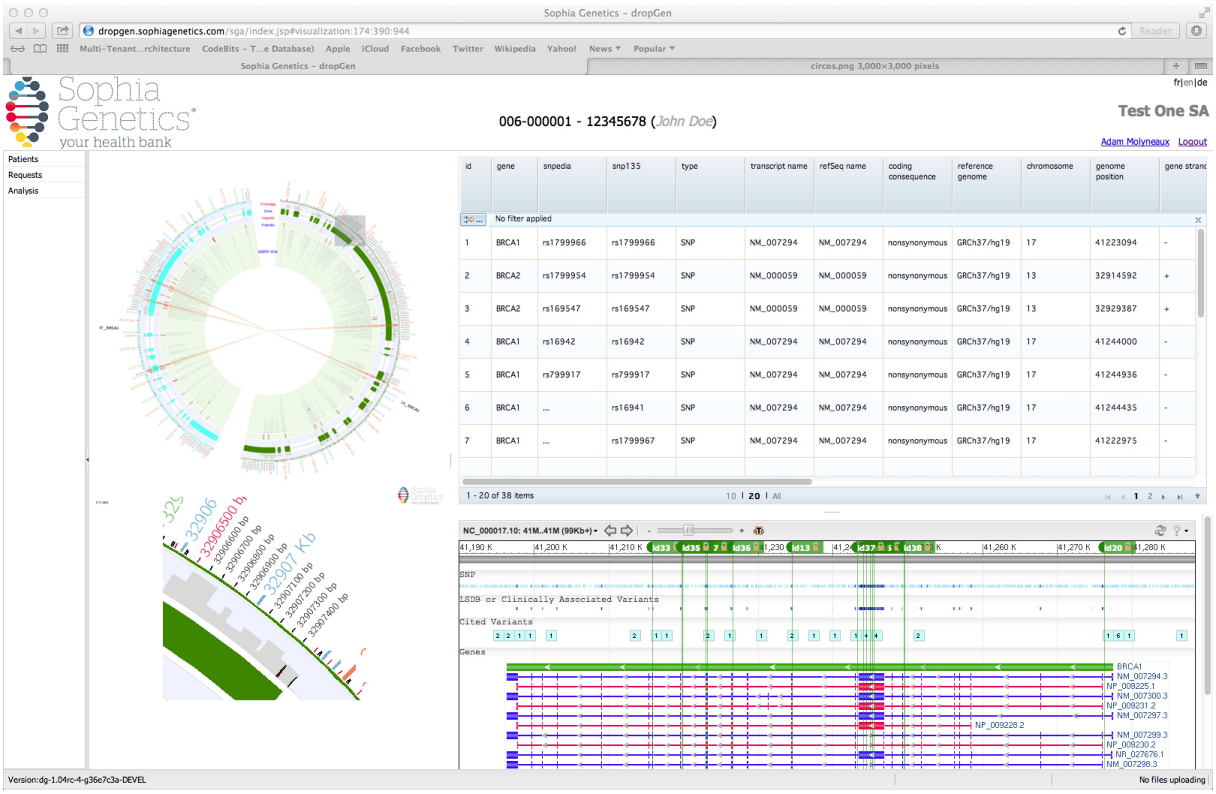
What we would like you to do is to look at the visualization page (Figure 1) and the circos plots (Figure 2 and circos.svg in the downloadable zip file) and come up with suggestions for:

- Alternative methods to display the same data as in Figure 1 (circos plot data + tabular data)
- Ideas for how the user could navigate the circos plot intuitively to look at both details and an overview as appropriate.
- An estimate for the time you would require to produce the circos functionality, and how you would go about it (what technologies would you choose)
- What do you expect to be the bottleneck in producing the circos graphic dynamically (ie in near real time) – are you confident it can be done ?

We appreciate that the user requirements are ill-defined and that you do not have unlimited time to spend on this (and your not being paid) – what we are looking for in this task is someone that:

- Is comfortable with graphics and graphical user interface development technologies within JAVA / JAVAFX / JavaScript.
- Able to imagine elegant graphical solutions to data display and to allow the user to interact with large quantities of data.
- Able to communicate their ideas to us simply and quickly

Please feel free to use whatever graphical support material you can (hand drawn is fine), and please go into as much detail as you can, given your time constraints.



Test One SA

006-000001 - 12345678 (*John Doe*)

id	gene	snpedia	snp135	type	transcript name	refSeq name	coding consequence	reference genome	chromosome	genome position	gene strand
No filter applied											
1	BRCA1	rs1799966	rs1799966	SNP	NM_007294	NM_007294	nonsynonymous	GRCh37/hg19	17	41223094	-
2	BRCA2	rs1799954	rs1799954	SNP	NM_000059	NM_000059	nonsynonymous	GRCh37/hg19	13	32914592	+
3	BRCA2	rs169547	rs169547	SNP	NM_000059	NM_000059	nonsynonymous	GRCh37/hg19	13	32929387	+
4	BRCA1	rs16942	rs16942	SNP	NM_007294	NM_007294	nonsynonymous	GRCh37/hg19	17	41244000	-
5	BRCA1	rs799917	rs799917	SNP	NM_007294	NM_007294	nonsynonymous	GRCh37/hg19	17	41244936	-
6	BRCA1	...	rs16941	SNP	NM_007294	NM_007294	nonsynonymous	GRCh37/hg19	17	41244435	-
7	BRCA1	...	rs1799967	SNP	NM_007294	NM_007294	nonsynonymous	GRCh37/hg19	17	41222975	-

1 - 20 of 38 items   10 | **20** | All   **1** 2

Version:dg-1.04rc-4-g36e7c3a-DEVEL

No files uploading

Figure 1 - Vizualization Page

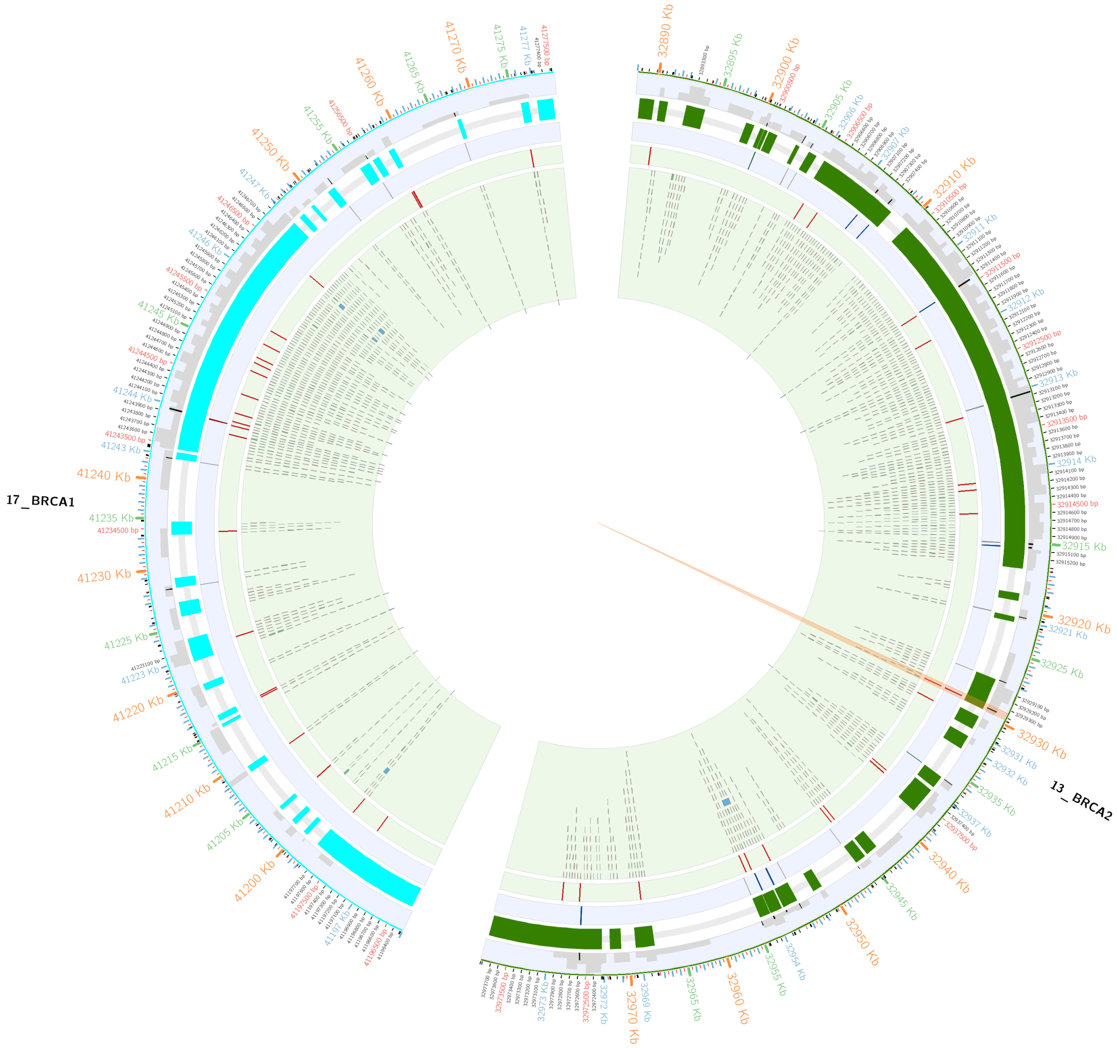


Figure 2 - Circos plot