Gene Transcripts

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Description

The human genome contains approximately 3.3 billion DNA bases in which only 7% of genetic sequence codes for proteins. Within the Genomic databases(NCIB-NIH and/or Emsembl), there are over 100,000 different proteins but only 22,000 genes exist. Therefore, one gene may contain several transcript expressions (or several different proteins).

Write a genetic display of a gene that contains various isoforms (different proteins) from that same gene. For example, gene(A) contains 30 exons that codes (1st gene transcript) for the 1st isoform whereas the same gene (may or maybe in a different cell type) uses 25 exons of same DNA sequence (2nd gene transcript) to code for 2nd isoform. Thus, a difference of 5 exons between two gene transcripts that come from the same chromosomal (gene) sequence.

Display the difference between the coding exons of gene transcripts and show the amino acid sequence for each protein.

Features

From a web page, a user can choose which gene to view.

Display the chromosomal location of gene.

Display the gene transcripts of the selected gene.

Display the exons of the gene transcript.

Display the exon comparisons between the gene transcripts.

Show the amino acid sequence of the gene transcript.

Planning – User Stories

Display gene transcripts from a particular gene to demonstrate the variation in different protein structure.

Display the untranslated and translated exons of each gene transcript.

Show the exon comparison between the different gene transcripts.

Express the amino acid sequence per gene transcript

Planning - Database

Located an API – chromosome ideogram of the gene location.

Use Javascript to further the layout of the gene structure (number of exons per gene transcript).

Create a JSON file for each gene transcript that contains the DNA sequence of per exon.

Use MongoDB to handle the DNA sequence.

Technology Stack

Languages: Java and JavaScript

SpringBoot: MVC

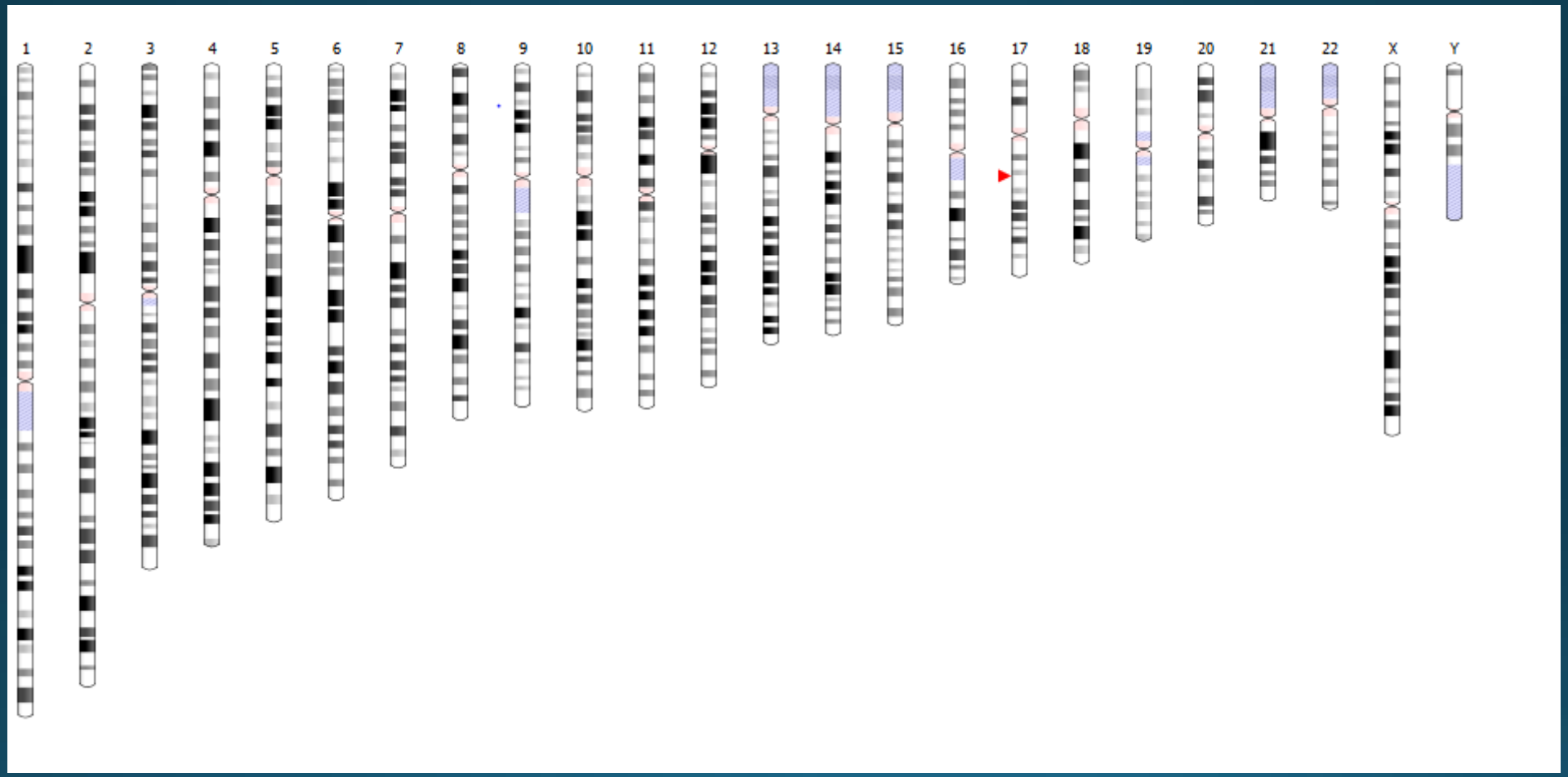
MongoDB (database)

ThymeLeaf

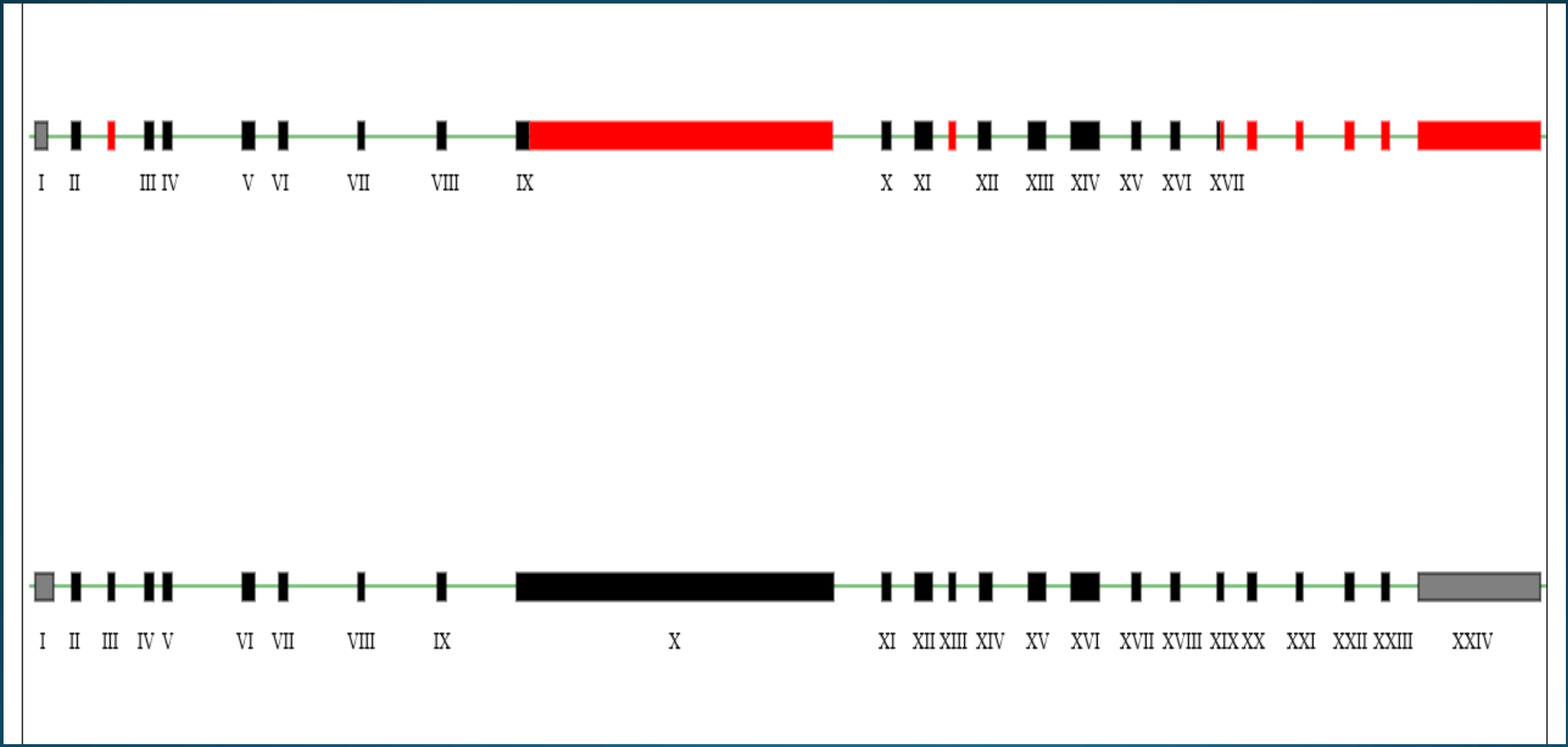
BootStrap

JSON files

Chromosomes



BRCA1 - gene transcript 222 and gene transcript 210



What I’ve learned

JavaScript

JSON file

MongoDB (database)