



ACDS Lecture Series

Lecture - 4

CSIR

Bootstrap and Galaxy

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(panels, labels, buttons, breadcrumbs, wells, glyphsicons)

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Bootstrap is a mobile-first, responsive framework for building web pages. That basically means it's a collection of HTML, CSS, and JavaScript that you can use to create web sites.

Sleek, Intuitive, and powerful Mobile first Front-End Framework

- Style guide for HTML Markup
- Common web design and layout patterns (CSS)
- Common widgets and functionality (JS)
- Faster and easier web development

Created by Mark Otto and Jacob Thornton when working @Twitter to encourage consistency across internal tools and speed up development

Why to use Bootstrap?

- # Easy to get started
- # Extensive list of components
- # Base styling for most HTML elements



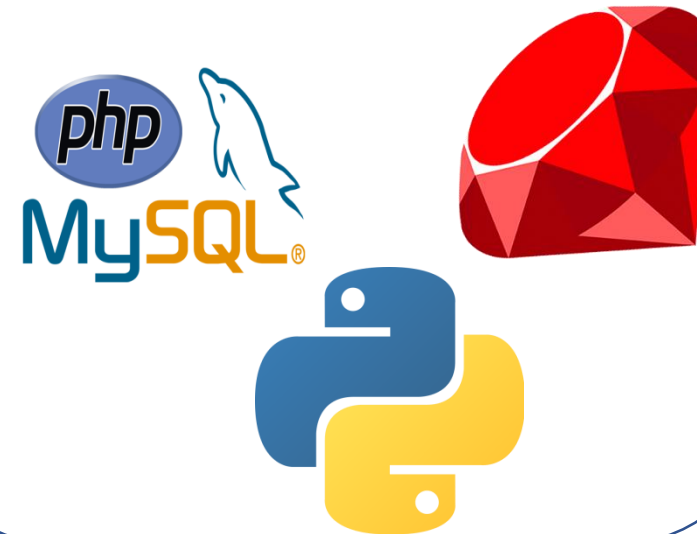
Front End

Everything that you see when using the web is a combination of HTML, CSS, and JavaScript all being controlled by your computer's browser. These include things like fonts, dropdown menus, buttons, transitions, sliders, contact forms, etc.



Back End

The backend usually consists of those parts that rely on server, an application, and a database. Backend technologies usually consist of languages like PHP, Ruby, Python, etc.



4.1.2 Advantages of Bootstrap Framework

ACDS, CSIR-NEIST

1

Rapid Development

Rather than coding from scratch, Bootstrap enables you to utilize ready made blocks of code to help you get started.

2

Responsiveness

There is virtually no work that needs to be done to achieve proper responsiveness.

3

Custom javascript plugins

A pack of JavaScript components for including the functionality that crafts it in simple way for operating things, such as tooltips, modal windows, alerts, etc.

4

Cross-Browser Compatibility

Don't have to worry about compatibility issues with Internet Explorer, Google chrome or Firefox, gives the same performance independent of the platform

5

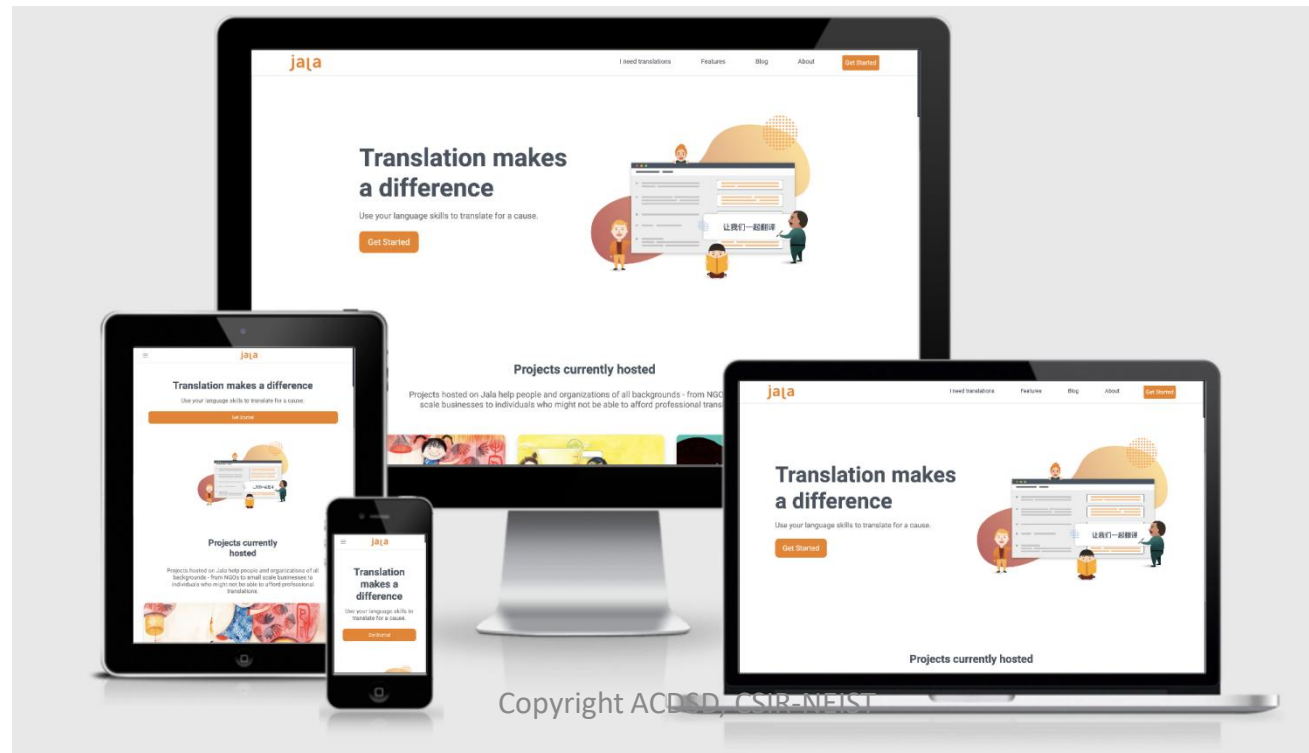
Support

A huge support community to help with issues, and also a good documentation to look and discover more about bootstrap and components

Responsive web design is about creating web pages that look good on all devices. A responsive web design will automatically adjust for different screen sizes and viewports.

Bootstrap 3 allows to make the images responsive by adding a class `.img-responsive` to the `` tag. This class applies `max-width: 100%;` and `height: auto;` to the image so that it scales nicely to the parent element.

``



Bootstrap has the 12 column Advanced Grid

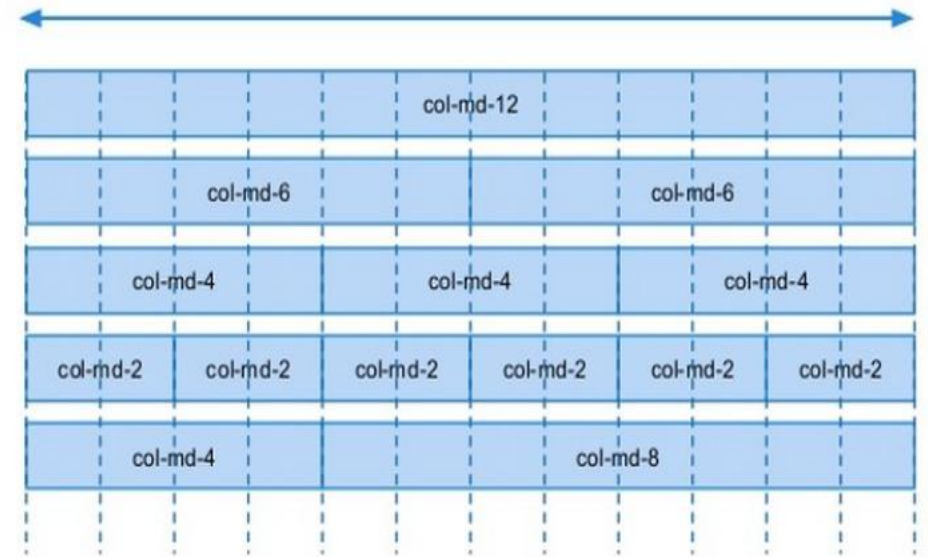
Bootstrap 3 features an always-responsive grid with a maximum size:

- 1.col-xs-* grids have no maximum size (auto) <768px (Extra Small Devices)
- 2.col-sm-* grids resize ≥ 768 px (Small Devices)
- 3.col-md-* grids resize ≥ 992 px (Medium Devices)
- 4.col-lg-* grids resize ≥ 1200 px (Large Devices)

One should choose col-md or col-lg for desktop sites

Can use two grid sizes for different screen sizes: \longrightarrow

```
<div class="row">
  <div class="col-md-4 col-xs-6">
    <!-- content -->
  </div>
  <div class="col-md-8 col-xs-6">
    <!-- content -->
  </div>
</div>
```



Classes in Bootstrap Grid



	Extra small devices Phones (<768px)	Small devices Tablets (≥768px)	Medium devices Desktops (≥992px)	Large devices Desktops (≥1200px)
Grid behavior	Horizontal at all times	Collapsed to start, horizontal above breakpoints	Collapsed to start, horizontal above breakpoints	Collapsed to start, horizontal above breakpoints
Max container width	None (auto)	750px	970px	1170px
Class prefix	.col-xs-	.col-sm-	.col-md-	.col-lg-
# of columns	12	12	12	12
Max column width	Auto	60px	78px	95px
Gutter width	30px (15px on each side of a column)	30px (15px on each side of a column)	30px (15px on each side of a column)	30px (15px on each side of a column)
Nestable	Yes	Yes	Yes	Yes
Offsets	Yes	Yes	Yes	Yes
Column ordering	Yes	Yes	Yes	Yes

Containers are used to pad the content inside of them, and there are two container classes available:

- ❑ The `.container` class provides a responsive fixed width container
- ❑ The `.container-fluid` class provides a full width container, spanning the entire width of the viewport



Classes	Extra small	small	Medium	Large	Extra Large
max-width	100%	540 px	720 px	960 px	1140 px

Example to use container fluid:

```
<div class="container-fluid">  
  <h1>My First Bootstrap Page</h1>  
  <p>This is some text.</p>  
</div>
```

Grid columns can offset in two ways: *responsive .offset- grid classes* and *margin utilities*.

Grid classes are sized to match columns while margins are more useful for quick layouts where the width of the offset is variable.

Offset Classes

```
<div class="row">
  <div class="col-md-4">.col-md-4</div>
  <div class="col-md-4 offset-md-4">.col-md-4 .offset-
md-4</div>
</div>
<div class="row">
  <div class="col-md-3 offset-md-3">.col-md-3 .offset-
md-3</div>
  <div class="col-md-3 offset-md-3">.col-md-3 .offset-
md-3</div>
</div>
<div class="row">
  <div class="col-md-6 offset-md-3">.col-md-6 .offset-
md-3</div>
</div>
```

Margin Utilities

```
<div class="row">
  <div class="col-md-4">.col-md-4</div>
  <div class="col-md-4 ml-auto">.col-md-4 .ml-auto</div>
</div>
<div class="row">
  <div class="col-md-3 ml-md-auto">.col-md-3 .ml-md-
auto</div>
  <div class="col-md-3 ml-md-auto">.col-md-3 .ml-md-
auto</div>
</div>
<div class="row">
  <div class="col-auto mr-auto">.col-auto .mr-auto</div>
  <div class="col-auto">.col-auto</div>
</div>
```

.col-sm-5 .col-md-6	.col-sm-5 .offset-sm-2 .col-md-6 .offset-md-0
.col-sm-6 .col-md-5 .col-lg-6	.col-sm-6 .col-md-5 .offset-md-2 .col-lg-6 .offset-lg-0

Source Code:

```
<div class="row">
  <div class="col-sm-5 col-md-6">.col-sm-5 .col-md-6</div>
  <div class="col-sm-5 offset-sm-2 col-md-6 offset-md-0">.col-sm-5 .offset-sm-2 .col-md-6 .offset-md-0</div>
</div>
<div class="row">
  <div class="col-sm-6 col-md-5 col-lg-6">.col-sm-6 .col-md-5 .col-lg-6</div>
  <div class="col-sm-6 col-md-5 offset-md-2 col-lg-6 offset-lg-0">.col-sm-6 .col-md-5 .offset-md-2 .col-lg-6
.offset-lg-0</div>
</div>
```


A navigation bar is a navigation header that is placed at the top of the page.

Types of Navigation bars	Code
Basic Navigation bar	<code><nav class="navbar navbar-expand-sm bg-light"></code>
Vertical bar	<code><nav class="navbar bg-light"></code>
Centered bar	<code><nav class="navbar navbar-expand-sm bg-light justify-content-center"></code>
Coloured bar	<code><nav class="navbar navbar-expand-sm bg-dark navbar-dark">...</nav></code>
Fixed navigation bar	<code><nav class="navbar navbar-expand-sm bg-dark navbar-dark fixed-top"> ... </nav></code>

A jumbotron indicates a big grey box for calling extra attention to some special content or information. Use a `<div>` element with class `.jumbotron` to create a jumbotron:

Example:

```
<body>
<div class="container">
  <div class="jumbotron">
    <h1>Bootstrap and Galaxy</h1>
    <p>This belongs to ACDS Lecture 4.</p>
  </div>
</div>
</body>
```

Bootstrap and Galaxy

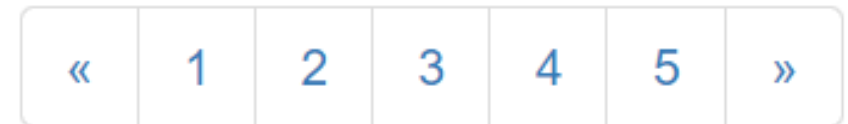
This belongs to ACDS Lecture 4.

To create a basic pagination, add the .pagination class to an element. Then add the .page-item to each element and a .page-link class to each link inside .

Example:

```
<nav aria-label="Page navigation">
  <ul class="pagination">
    <li> <a href="#" aria-label="Previous">
      <span aria-hidden="true">&laquo;</span>
    </a>
  </li>
  <li><a href="#">1</a></li>
  <li><a href="#">2</a></li>
  <li><a href="#">3</a></li>
  <li><a href="#">4</a></li>
  <li><a href="#">5</a></li>
  <li>
    <a href="#" aria-label="Next">
      <span aria-hidden="true">&raquo;</span>
    </a>
  </li>
</ul>
</nav>
```

Output:



Bootstrap provides you with following types of form layouts:

- ☐ Vertical (default) form
- ☐ Inline form
- ☐ Horizontal form

Vertical Form

- ☐ Add a role form to the parent `<form>` element.
- ☐ Wrap labels and controls in a `<div>` with class `.form-group`. This is needed for optimum spacing.
- ☐ Add a class of `.form-control` to all textual `<input>`, `<textarea>`, and `<select>` elements.

Inline Form

To create a form where all of the elements are inline, left aligned and labels are alongside, add the class `.form-inline` to the `<form>` tag.

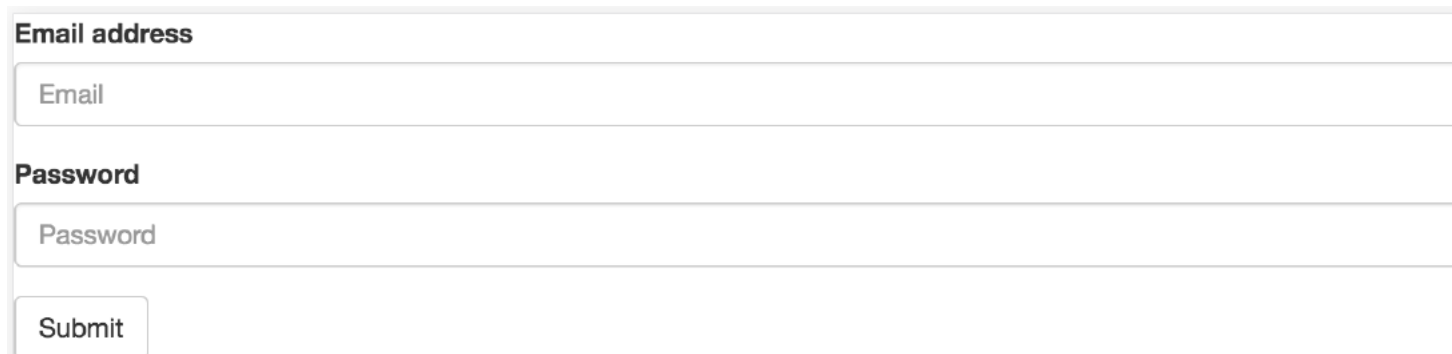
Horizontal Form

- ☐ Add a class of `.form-horizontal` to the parent `<form>` element.
- ☐ Wrap labels and controls in a `<div>` with class `.form-group`.
- ☐ Add a class of `.control-label` to the labels.

Individual form controls automatically receive some global styling.

- ❑ All textual `<input>`, `<textarea>`, and `<select>` elements with `.form-control` are set to `width: 100%`; by default.
- ❑ Wrap labels and controls in `.form-group` for optimum spacing.
- ❑ Do not mix form groups directly with input groups. Instead, nest the input group inside of the form group.

```
<form>
  <div class="form-group">
    <label for="exampleInputEmail">Email address</label>
    <input type="email" class="form-control" id="exampleInputEmail" placeholder="Email">
  </div>
  <div class="form-group">
    <label for="exampleInputPassword1">Password</label>
    <input type="password" class="form-control" id="exampleInputPassword1" placeholder="Password">
  </div>
  <button type="submit" class="btn btn-default">Submit</button>
</form>
```



Email address













Password

Submit

Bootstrap Plugins can be included on your site in two forms –

Individually – Using Bootstrap's individual `*.js` files. Some plugins and CSS components depend on other plugins. If you include plugins individually, make sure to check for these dependencies in the docs.

Compiled (all at once) – Using `bootstrap.js` or the minified `bootstrap.min.js`. Do not attempt to include both, as both `bootstrap.js` and `bootstrap.min.js` contain all plugins in a single file.

 Bootstrap - Transition Plugin
 Bootstrap - Modal Plugin
 Bootstrap - Dropdown Plugin
 Bootstrap - Scrollspy Plugin
 Bootstrap - Tab Plugin
 Bootstrap - Tooltip Plugin
 Bootstrap - Popover Plugin
 Bootstrap - Alert Plugin
 Bootstrap - Button Plugin
 Bootstrap - Collapse Plugin
 Bootstrap - Carousel Plugin
 Bootstrap - Affix Plugin

Example:

```
<div class = "alert alert-success">  
  <a href = "#" class = "close" data-dismiss = "alert"> &times;  
  </a>  
  <strong>Warning!</strong> There was a problem with your network  
  connection.  
</div>
```

Output:

Warning! There was a problem with your network connection.

- ❑ Bootstrap comes packed with tons of ready-to-use jQuery-powered plugins.
- ❑ The beauty of Bootstrap plugins is that it can slot them into a project by writing the appropriate markup using data- attributes, and the JavaScript kicks in automatically.

Examples:

Changing color of “success”:

```
selector { background-color: var(--success); }
```

Changing alert original values :

```
.alert { padding: 2rem 1.50rem; margin-bottom: 1.5rem; border-radius: 50rem; }
```

Customizing CSS:

```
.alert-zoom-in-out { font-size: 16px; height: auto; top: 20px; color: rgb(12, 84, 96); background-color: rgb(209, 236, 241); }  
.high-contrast-on, .high-contrast-on a, .high-contrast-on i { background-color: rgb(12, 84, 96); color: rgb(209, 236, 241); }
```

A bootstrap source code to design a unordered list.

```
<body>
<div class="container">
<div class="row">
<div class="col-md-4">
<ul>
<li>MySQL is a database management system.</li>
<li>MySQL databases are relational.</li>
<li>MySQL software is Open Source.</li>
<li>Initial release : 23 May 1995</li>
<li>Current stable release : 5.6.13 / 30&nbsp;July 2013</li>
<li>Written in : C,&nbsp;C++</li>
<ul>
<li>Windows</li>
<li>Linux</li>
<li>Macintosh</li>
</ul>
</li>
<li>Available in : English</li>
<li>License of MySQL is available under GNU General Public License&nbsp;(version 2) or proprietary&nbsp;EULA.</li>
<li>MySQL reduces the Total Cost of Ownership (TCO)
</div>
</div>
</div>
```

</body>

Output

- MySQL is a database management system.
- MySQL databases are relational.
- MySQL software is Open Source.
- The MySQL Database Server is fast, reliable, scalable, and easy to use.
- MySQL Server works in client/server or embedded systems.
- Initial release : 23 May 1995
- Current stable release : 5.6.13 / 30 July 2013
- Written in : C, C++
- Operating system : Cross-platform
 - Windows
 - Linux
 - Macintosh

A bootstrap source code to for small texts.

```
<head>
<title>Twitter Bootstrap Small Text Example</title>
<link rel="stylesheet" href="http://maxcdn.bootstrapcdn.com/bootstrap/3.2.0/css/bootstrap.min.css">
<link rel="stylesheet" href="http://maxcdn.bootstrapcdn.com/bootstrap/3.2.0/css/bootstrap-theme.min.css">
<script src="http://ajax.googleapis.com/ajax/libs/jquery/1.11.1/jquery.min.js"></script>
<script src="http://maxcdn.bootstrapcdn.com/bootstrap/3.2.0/js/bootstrap.min.js"></script>
</head>
<body>
<div class="container">
<div class="row">
<div class="col-md-4">
<p>small tag can be used to <small>render Small text</small></p>
</div>
</div>
</div>
</body>
```

Output

small tag can be used to render Small text

A bootstrap source code to design a inline list.

```
<body>
<div class="container">
<div class="row">
<div class="col-md-12">
<ul class="list-inline">
<li>MySQL is a database management system.</li>
<li>MySQL databases are relational.</li>
<li>MySQL software is Open Source.</li>
</ul>
</div>
</div>
</div>
</body>
```

Output

```
MySQL is a database management system.
MySQL databases are relational.
MySQL software is Open Source.
```


- ❑ A data analysis and integration tool
- ❑ A web service integrating a wealth of tools, computer resources, terabytes of data and permanent storage
- ❑ Open source software that enables integrating and customizing sites

The screenshot displays the Galaxy web interface. The top navigation bar includes links for 'Analyze Data', 'Workflow', 'Visualize', 'Shared Data', 'Help', 'Login or Register', and a 'Using 0%' status indicator. A warning message states: 'Tools that run on PSC Bridges (Unicycler, SPAdes, Trinity) are experiencing delays due to heavy utilization on that system. Please leave your jobs queued, they will run when resources are available.'

Tools Sidebar: Features a search bar and categories like 'Get Data', 'Collection Operations', 'GENERAL TEXT TOOLS' (with sub-items: Text Manipulation, Filter and Sort, Join, Subtract and Group, Datamash), 'GENOMIC FILE MANIPULATION' (with sub-items: FASTA/FASTQ, FASTQ Quality Control, SAM/BAM), and a left arrow icon at the bottom.

Main Content Area: Contains a paragraph describing Galaxy as an open source, web-based platform for data intensive biomedical research. Below this is the JXTX logo (a stylized 'JXTX' with a colorful DNA helix) and the text 'James P. Taylor Foundation' and 'Design by Rebekka Paisner'. To the right, a quote from James Taylor (1979-2020) is displayed: 'believed that scientific progress can best be sustained through the mentoring of students and junior faculty.' Below the quote, a paragraph explains the foundation's mission: 'To ensure implementation of this vision, the Galaxy community has established a foundation—JXTX: The James P. Taylor Foundation for Open Science. The JXTX Foundation's mission is to (1) assist graduate students to participate in computational biology and data science conferences, and (2) organize and host mentoring sessions between senior and junior faculty.'

History Sidebar: Includes a search bar, a section for 'Unnamed history' (empty), and a blue information box stating: 'This history is empty. You can load your own data or get data from an external source'.

Galaxy Conceptual Framework

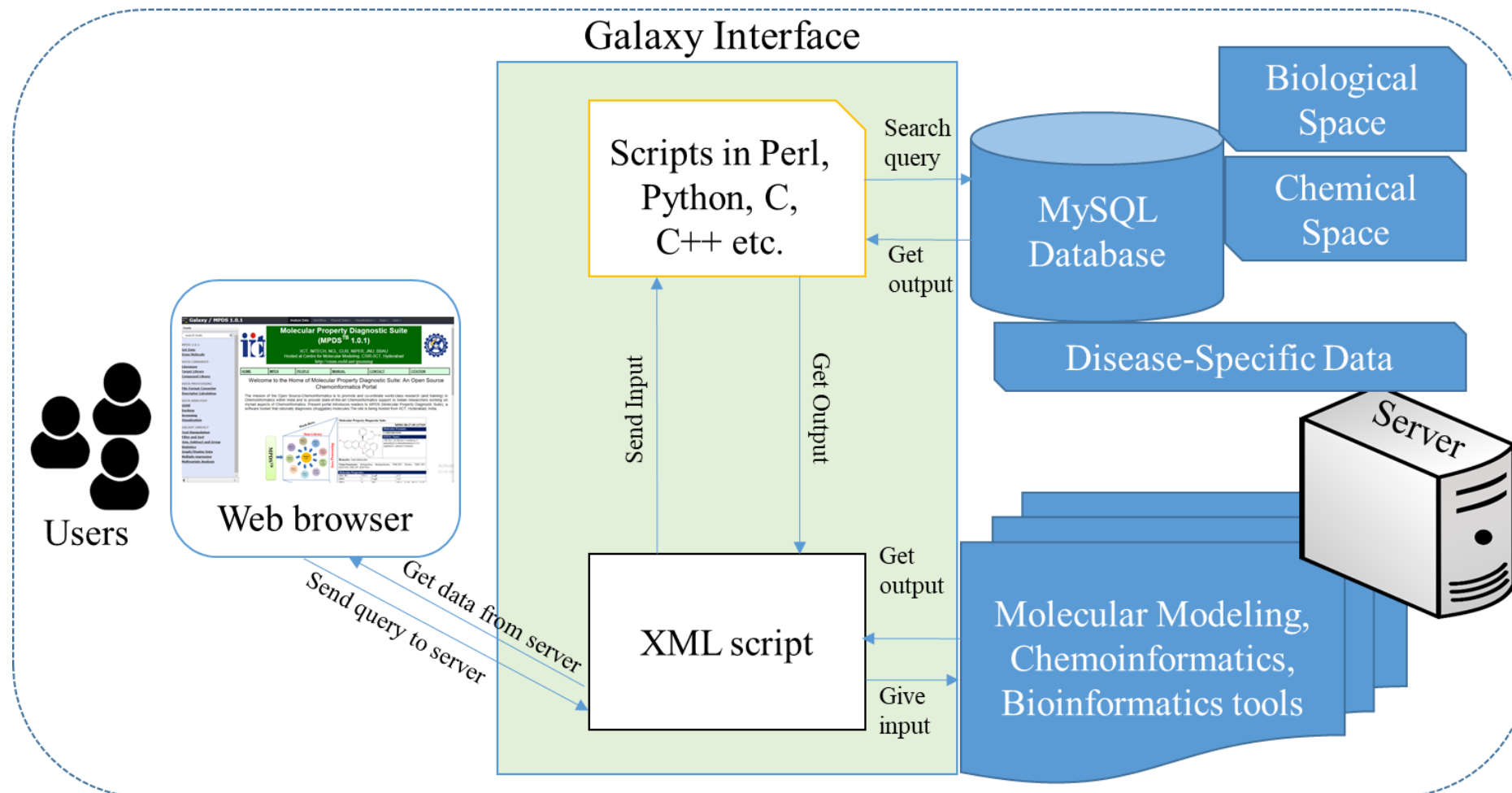
Obtain data from many data sources including the UCSC Table Browser, BioMart, WormBase, or your own data.

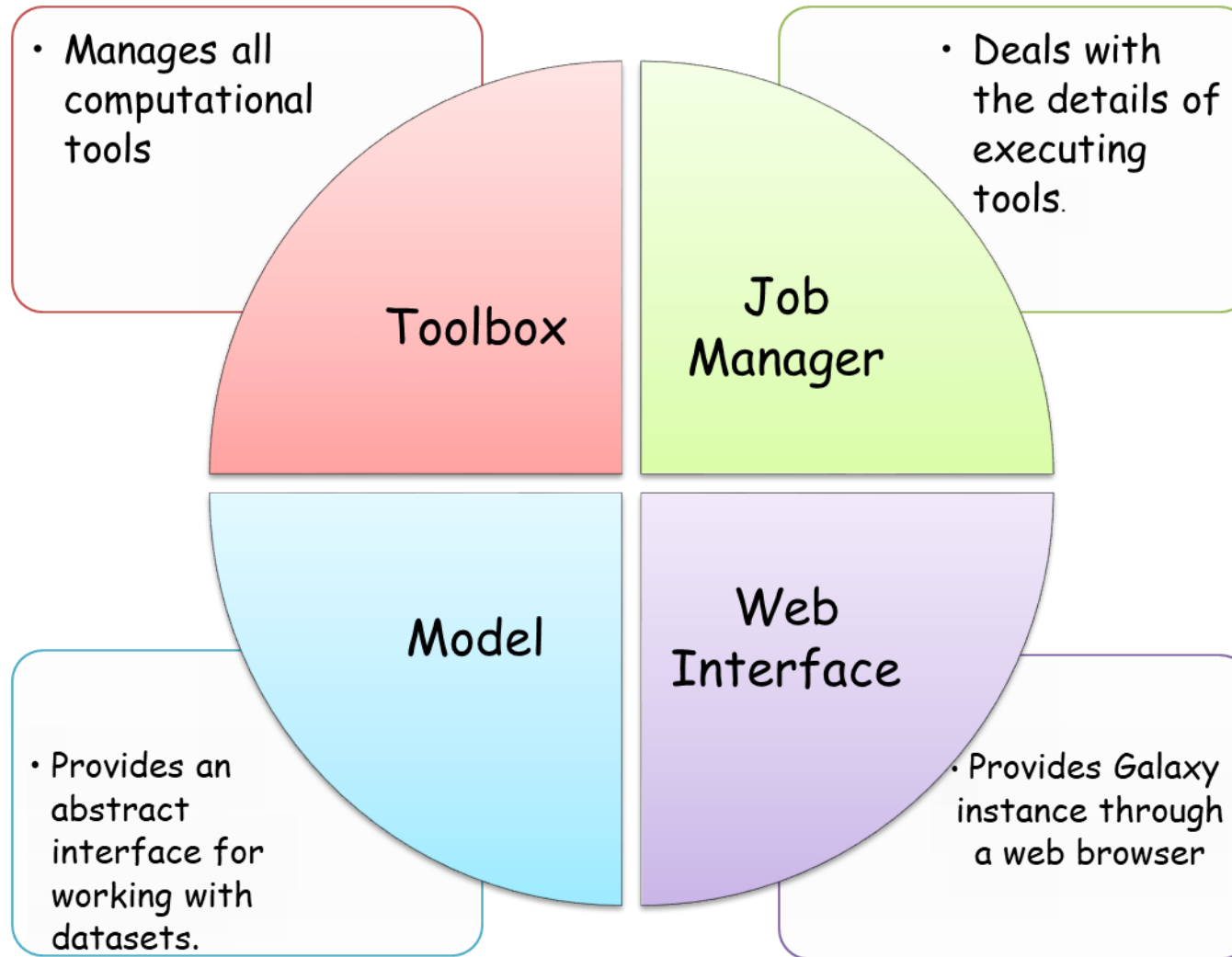
Prepare data for further analysis by rearranging or cutting data columns, filtering data and many other actions.

Analyze data by finding overlapping regions, determining statistics, phylogenetic analysis and much more

The screenshot displays the Galaxy web interface, which is a platform for genomic data analysis. The interface is divided into several sections:

- Tools:** A sidebar on the left lists various tools available in Galaxy, including "Get Data", "Send Data", "Text Manipulation", "Filter and Sort", "Join, Subtract and Group", "Convert Formats", "FASTA manipulation", "Extract Features", "Fetch Sequences", "Fetch Alignments", "Fetch Genomic Scores", "Operate on Genomic Intervals", "Statistics", "Graph/Display Data", "Regional Variation", "Multiple comparisons", "Evolution: HyPhy", "Taxonomy manipulation", and "EMBOSS".
- Home Genomes Genome Browser Blat Tables Gene Sort:** A navigation bar at the top of the main content area.
- Table Browser:** A section titled "Use this program to interact with this application" that provides instructions for using the Table Browser tool. It includes a "Tools" section with options like "Get Data", "Send Data", "ENCODE Tools", "Lift-Over", "Text Manipulation", "Filter and Sort", "Join, Subtract and Group", "Convert Formats", "FASTA manipulation", "Fetch Sequences", "Fetch Alignments", "Fetch Genomic Scores", "Operate on Genomic Intervals", "Statistics", "Graph/Display Data", "Regional Variation", "Multiple comparisons", "Evolution: HyPhy", "Taxonomy manipulation", and "EMBOSS".
- Filter:** A section titled "Filter" that allows users to filter data based on various criteria. It includes a "Tools" section with options like "Get Data", "Send Data", "ENCODE Tools", "Lift-Over", "Text Manipulation", "Filter and Sort", "Join, Subtract and Group", "Convert Formats", "FASTA manipulation", "Fetch Sequences", "Fetch Alignments", "Fetch Genomic Scores", "Operate on Genomic Intervals", "Statistics", "Graph/Display Data", "Regional Variation", "Multiple comparisons", "Evolution: HyPhy", "Taxonomy manipulation", and "EMBOSS".
- Join:** A section titled "Join" that allows users to join data from different sources. It includes a "Tools" section with options like "Get Data", "Send Data", "ENCODE Tools", "Lift-Over", "Text Manipulation", "Filter and Sort", "Join, Subtract and Group", "Convert Formats", "FASTA manipulation", "Fetch Sequences", "Fetch Alignments", "Fetch Genomic Scores", "Operate on Genomic Intervals", "Statistics", "Graph/Display Data", "Regional Variation", "Multiple comparisons", "Evolution: HyPhy", "Taxonomy manipulation", and "EMBOSS".
- Statistics:** A section titled "Statistics" that allows users to calculate various statistics for their data. It includes a "Tools" section with options like "Get Data", "Send Data", "ENCODE Tools", "Lift-Over", "Text Manipulation", "Filter and Sort", "Join, Subtract and Group", "Convert Formats", "FASTA manipulation", "Fetch Sequences", "Fetch Alignments", "Fetch Genomic Scores", "Operate on Genomic Intervals", "Statistics", "Graph/Display Data", "Regional Variation", "Multiple comparisons", "Evolution: HyPhy", "Taxonomy manipulation", and "EMBOSS".
- Graph/Display Data:** A section titled "Graph/Display Data" that allows users to visualize their data in various ways. It includes a "Tools" section with options like "Get Data", "Send Data", "ENCODE Tools", "Lift-Over", "Text Manipulation", "Filter and Sort", "Join, Subtract and Group", "Convert Formats", "FASTA manipulation", "Fetch Sequences", "Fetch Alignments", "Fetch Genomic Scores", "Operate on Genomic Intervals", "Statistics", "Graph/Display Data", "Regional Variation", "Multiple comparisons", "Evolution: HyPhy", "Taxonomy manipulation", and "EMBOSS".
- Regional Variation:** A section titled "Regional Variation" that allows users to analyze regional variation in their data. It includes a "Tools" section with options like "Get Data", "Send Data", "ENCODE Tools", "Lift-Over", "Text Manipulation", "Filter and Sort", "Join, Subtract and Group", "Convert Formats", "FASTA manipulation", "Fetch Sequences", "Fetch Alignments", "Fetch Genomic Scores", "Operate on Genomic Intervals", "Statistics", "Graph/Display Data", "Regional Variation", "Multiple comparisons", "Evolution: HyPhy", "Taxonomy manipulation", and "EMBOSS".
- Multiple comparisons:** A section titled "Multiple comparisons" that allows users to perform multiple comparisons on their data. It includes a "Tools" section with options like "Get Data", "Send Data", "ENCODE Tools", "Lift-Over", "Text Manipulation", "Filter and Sort", "Join, Subtract and Group", "Convert Formats", "FASTA manipulation", "Fetch Sequences", "Fetch Alignments", "Fetch Genomic Scores", "Operate on Genomic Intervals", "Statistics", "Graph/Display Data", "Regional Variation", "Multiple comparisons", "Evolution: HyPhy", "Taxonomy manipulation", and "EMBOSS".
- Evolution: HyPhy:** A section titled "Evolution: HyPhy" that allows users to perform phylogenetic analysis on their data. It includes a "Tools" section with options like "Get Data", "Send Data", "ENCODE Tools", "Lift-Over", "Text Manipulation", "Filter and Sort", "Join, Subtract and Group", "Convert Formats", "FASTA manipulation", "Fetch Sequences", "Fetch Alignments", "Fetch Genomic Scores", "Operate on Genomic Intervals", "Statistics", "Graph/Display Data", "Regional Variation", "Multiple comparisons", "Evolution: HyPhy", "Taxonomy manipulation", and "EMBOSS".
- Taxonomy manipulation:** A section titled "Taxonomy manipulation" that allows users to manipulate taxonomic data. It includes a "Tools" section with options like "Get Data", "Send Data", "ENCODE Tools", "Lift-Over", "Text Manipulation", "Filter and Sort", "Join, Subtract and Group", "Convert Formats", "FASTA manipulation", "Fetch Sequences", "Fetch Alignments", "Fetch Genomic Scores", "Operate on Genomic Intervals", "Statistics", "Graph/Display Data", "Regional Variation", "Multiple comparisons", "Evolution: HyPhy", "Taxonomy manipulation", and "EMBOSS".
- EMBOSS:** A section titled "EMBOSS" that allows users to perform various bioinformatics analyses using the EMBOSS suite of tools. It includes a "Tools" section with options like "Get Data", "Send Data", "ENCODE Tools", "Lift-Over", "Text Manipulation", "Filter and Sort", "Join, Subtract and Group", "Convert Formats", "FASTA manipulation", "Fetch Sequences", "Fetch Alignments", "Fetch Genomic Scores", "Operate on Genomic Intervals", "Statistics", "Graph/Display Data", "Regional Variation", "Multiple comparisons", "Evolution: HyPhy", "Taxonomy manipulation", and "EMBOSS".





4.4.3 Custom Tools to galaxy

Script or a program written for any given problem in CADD and related area can be added into galaxy and made available as a tool.

```
#!/usr/bin/perl -w
open (IN, "<$ARGV[0]<");
open (OUT, ">$ARGV[1]>");
while (<IN>) {
    chop;
    if (m/^\>/) {
        s/^\>/;
        if ($. > 1) {
            print OUT sprintf("%.3f", $gc/$length) . "\n";
        }
        $gc = 0;
        $length = 0;
    } else {
        ++$gc while m/[gc]/ig;
        $length += length $_;
    }
}
print OUT sprintf("%.3f", $gc/$length) . "\n";
close( IN );
close( OUT );
```

toolExample.pl

```
<tool id="fa_gc_content_1" name="Compute GC content" version="0.1.0">
  <description>for each sequence in a file</description>
  <command interpreter="perl">toolExample.pl $input $output</command>
  <inputs>
    <param format="fasta" name="input" type="data" label="Source file" />
  </inputs>
  <outputs>
    <data format="tabular" name="output" />
  </outputs>

  <tests>
    <test>
      <param name="input" value="fa_gc_content_input.fa"/>
      <output name="out_file1" file="fa_gc_content_output.txt"/>
    </test>
  </tests>

  <help>
    This tool computes GC content from a FASTA file.
  </help>
</tool>
```

toolExample.xml



Custom tools to MPDS Galaxy

```
#!/usr/bin/perl -w
open (IN, "<$ARGV[0]<");
open (OUT, ">$ARGV[1]>");
while (<IN>) {
    chop;
    if (m/^>/) {
        s/^>//;
        if ($. > 1) {
            print OUT sprintf("%.3f", $gc/$length) . "\n";
        }
        $gc = 0;
        $length = 0;
    } else {
        ++$gc while m/[gc]/ig;
        $length += length $_;
    }
}
print OUT sprintf("%.3f", $gc/$length) . "\n";
close( IN );
close( OUT );
```

toolExample.pl

```
<tool id="fa_gc_content_1" name="Compute GC content" version="0.1.0">
  <description>for each sequence in a file</description>
  <command interpreter="perl">toolExample.pl $input $output</command>
  <inputs>
    <param format="fasta" name="input" type="data" label="Source file" />
  </inputs>
  <outputs>
    <data format="tabular" name="output" />
  </outputs>

  <tests>
    <test>
      <param name="input" value="fa_gc_content_input.fa"/>
      <output name="out_file1" file="fa_gc_content_output.txt"/>
    </test>
  </tests>

  <help>
    This tool computes GC content from a FASTA file.
  </help>
</tool>
```

toolExample.xml

The screenshot shows the Galaxy web interface. The top navigation bar includes 'Galaxy', 'Analyze Data', 'Workflow', 'Shared Data', 'Help', and 'User'. The left sidebar has a 'Tools' section with a search bar and a list of tools, including 'Compute GC content for each sequence in a file'. The main panel displays the 'Compute GC content' tool configuration, with a 'Source file' input field and an 'Execute' button. The right sidebar shows a 'History' section with a message: 'Your history is empty. Click 'Get Data' on the left pane to start'.

1. Use bootstrap to implement ~~strike through~~, underlined and *italics* text.
2. Write a program to create Blockquote with right-aligned content
3. Use bootstrap to create a bordered table.
4. 4. Write a program to create a bootstrap responsive table.

- Spurlock, J., *Bootstrap: Responsive Web Development*. O'Reilly Media, Inc. (2013).
 - This book gives a practical approach to design webpages using HTML, CSS and Bootstrap. jQuery is also being covered in this book ★ ★ ★ ★
- Forbes, A., *The Joy of Bootstrap: A smarter way to learn the world's most popular web framework*, Createspace Independent Pub, (2015)
 - This book has huge number of examples to implement Bootstrap in web development. ★ ★ ★ ★
- Ludo, M., *HTML 5, CSS 3 & Bootstrap 4 All-in-One: a complete introduction to front end web development*, Code Blaze Books, (2019)
 - This is more like a three-books-in-one collection with a complete introduction to front end web development and design, combining the HTML 5, CSS 3 and Bootstrap 4 Visual Learning Guides. ★ ★ ★ ★
- Lett, J., *Bootstrap 4 Quick Start: Responsive Web Design and Development Basics for Beginners*, Bootstrap Creative, (2019)
 - Provides a large number of practical examples along with building responsive pages using Bootstrap. ★ ★ ★

Thank You