1. Computer Systems - Course Overview

CT1100 - J. Duggan

CT1100 Overview

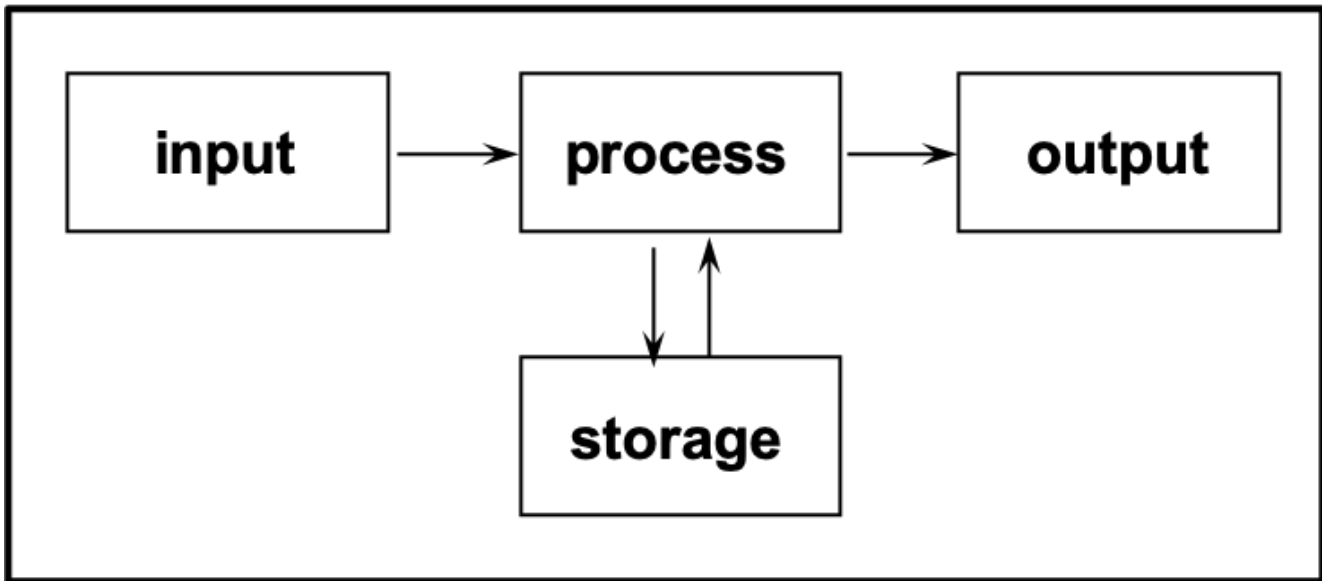
- Exploring the essential building blocks of the information age
- Semester 1 (J. Duggan)
  - Data
  - Hardware
- Semester 2 (M. Rezaei)
  - Software
  - Networks
- Module Information
  - Compulsory for all first year BA students taking IT as a subject
  - Labs from week 4 (1 hour per week, 3 time slots)
  - Worth 5 ECTS in credit
  - Covered in Semester 1 and Semester 2
  - Continuous Assessment (MCQ tests, Assigments, Lab Exam)
  - https://github.com/JimDuggan/CT1100

Overall Plan (Semester 1)

Lecture(s)	Topic
1	Course Introduction
2	The Processing Cycle and Binary Data
3	Data in R with Atomic Vectors
4	The CRAN Library and Calling Functions in R
5	Tidy Data and Data Frames
6-7	**ggplot2** - A Grammar of Graphics
8-10	**dplyr** - A Grammar of Data Manipulation
11-12	Introduction to Hardware

The Processing Cycle in Computing

- Input, Process, Output key stages in computing
- Image recognition
  - Input (a photo)
  - Process (an algorithm)
  - Output (a name)



Sample Input Data (Match Events)

Time	Team	Scorer	From	Type	Points	Score
1	Dublin	Paul Mannion	Play	Point	1	1
2	Kerry	Sean O'Shea	Play	Point	1	1
3	Dublin	Dean Rock	Play	Point	1	2
4	Dublin	Dean Rock	Free	Point	1	3
10	Kerry	David Clifford	Play	Point	1	2
13	Kerry	Sean O'Shea	FortyFive	Point	1	3
14	Kerry	Stephen O'Brien	Play	Point	1	4
16	Dublin	Paul Mannion	Play	Point	1	4
18	Kerry	Sean O'Shea	Free	Point	1	5
19	Dublin	Jack McCaffrey	Play	Goal	3	7

Processing - Summarising the Data

```
## # A tibble: 10 x 3
## # Groups:   Team [2]
##    Team   Scorer             Points
##    <chr>  <chr>               <dbl>
##  1 Dublin Dean Rock              10
##  2 Dublin Jack McCaffrey          6
##  3 Dublin Paul Mannion            2
##  4 Dublin Con O'Callaghan         1
##  5 Kerry  Sean O'Shea            10
##  6 Kerry  Killian Spillane        4
##  7 Kerry  David Clifford          2
##  8 Kerry  Gavin Crowley           1
##  9 Kerry  Stephen O'Brien         1
## 10 Kerry  Tommy Walsh             1
```

Processing - Analysing the Scores

```
## # A tibble: 6 x 3
## # Groups:   Team [2]
##   Team   From       Points
##   <chr>  <chr>       <dbl>
## 1 Dublin Play           12
## 2 Dublin Free            6
## 3 Dublin FortyFive       1
## 4 Kerry  Play           12
## 5 Kerry  Free            4
## 6 Kerry  FortyFive       3
```

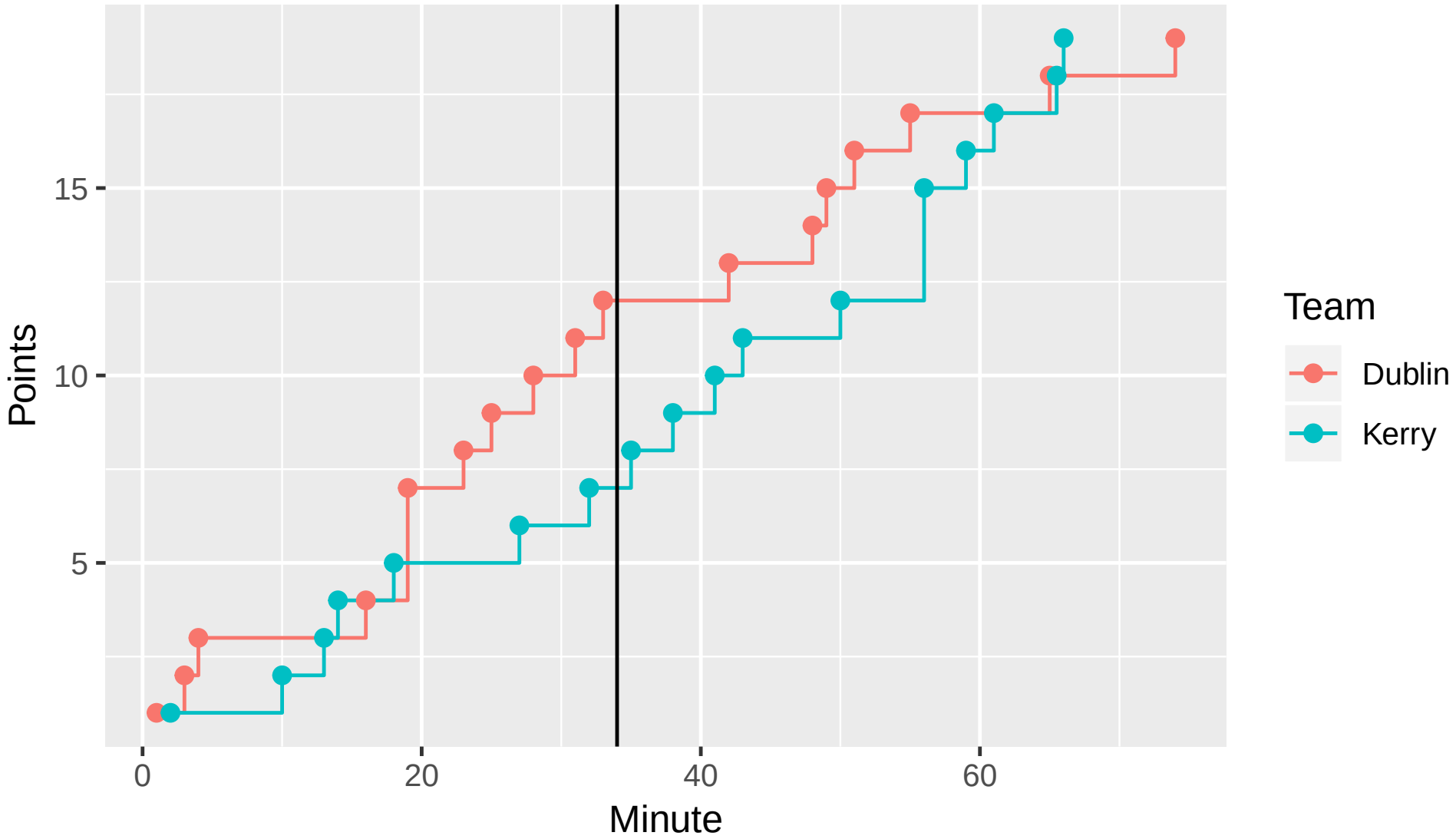
Processing - Before the 34th Minute

```
## # A tibble: 6 x 3
## # Groups:   Team [2]
##   Team   From       Points
##   <chr>  <chr>       <dbl>
## 1 Dublin Play            8
## 2 Dublin Free            3
## 3 Dublin FortyFive       1
## 4 Kerry  Free            3
## 5 Kerry  Play            3
## 6 Kerry  FortyFive       1
```

Processing - After the 34th Minute

```
## # A tibble: 5 x 3
## # Groups:   Team [2]
##   Team   From       Points
##   <chr>  <chr>       <dbl>
## 1 Dublin Play            4
## 2 Dublin Free            3
## 3 Kerry  Play            9
## 4 Kerry  FortyFive       2
## 5 Kerry  Free            1
```

Processing - Visualising the Data



Data processing in R

```
x <- c(3, 4, 5, 6, 7)
x
```

```
## [1] 3 4 5 6 7
```

```
x[1:2]
```

```
## [1] 3 4
```

```
sum(x)
```

```
## [1] 25
```

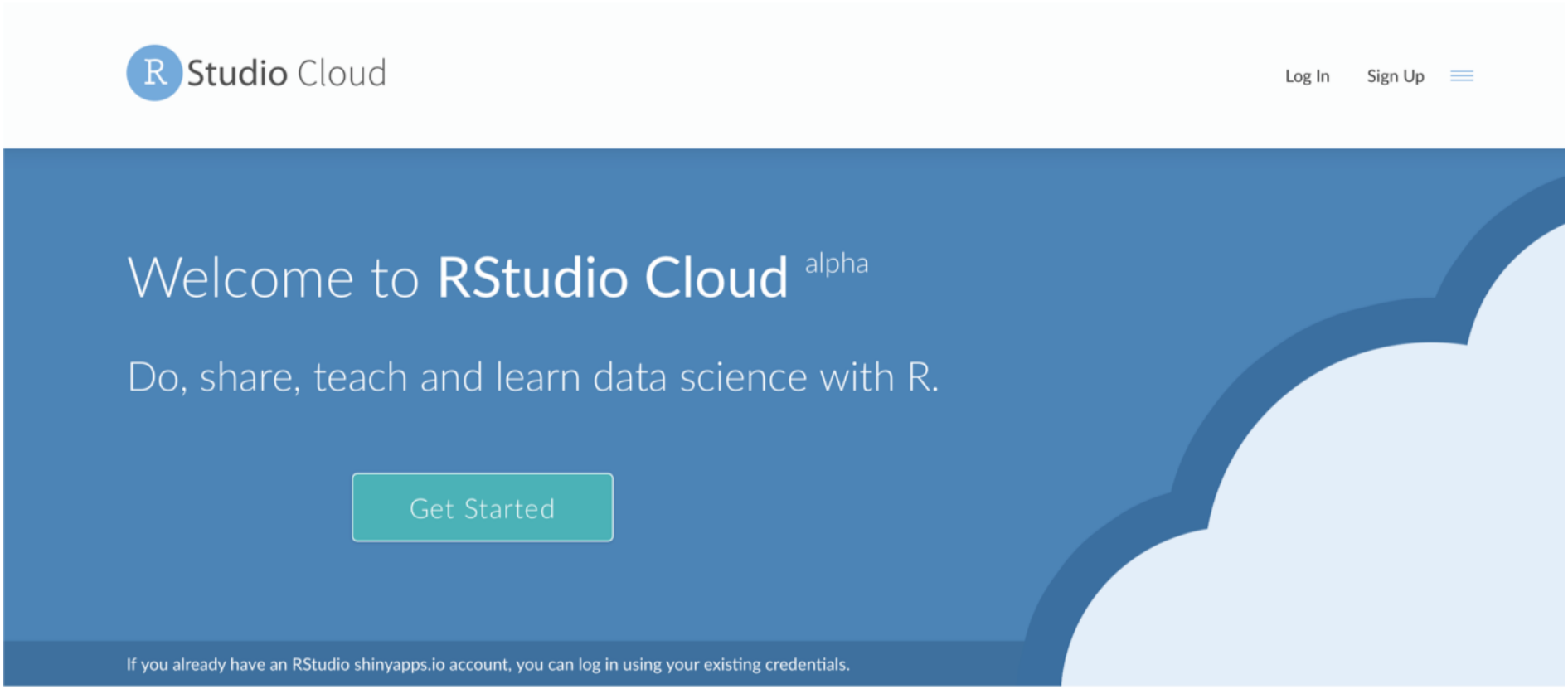
```
mean(x)
```

```
## [1] 5
```

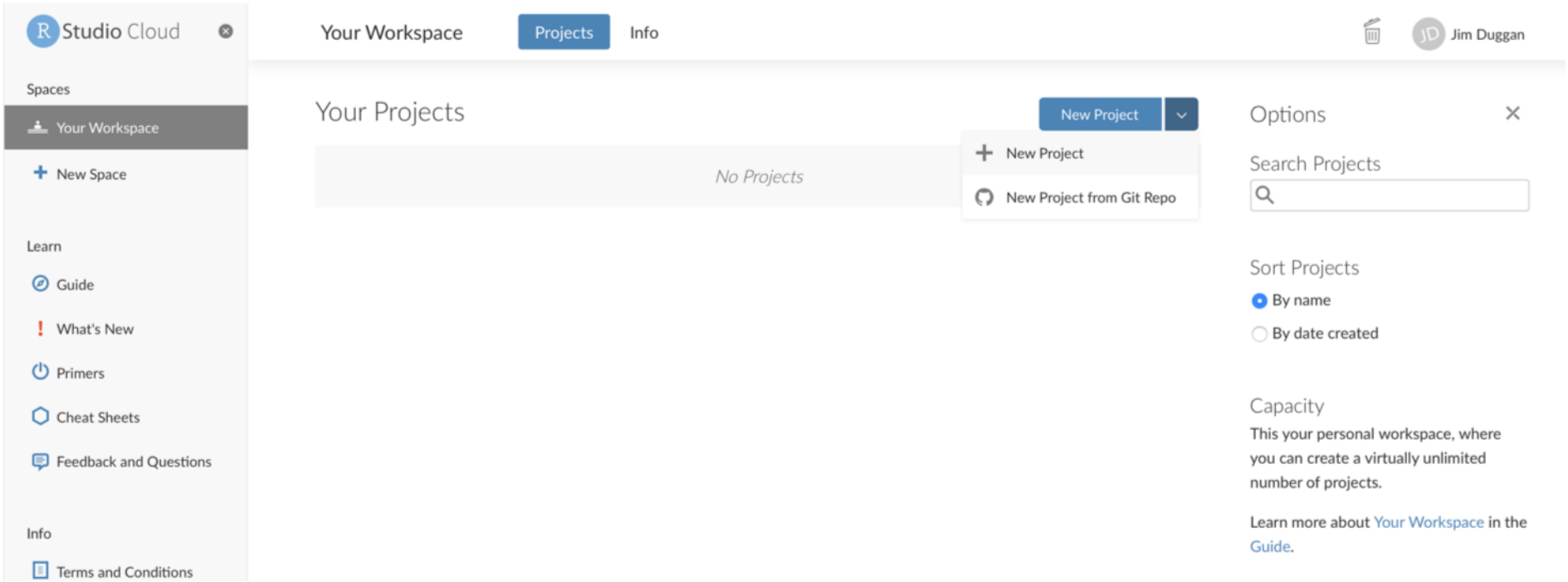
```
x > 5
```

```
## [1] FALSE FALSE FALSE  TRUE  TRUE
```

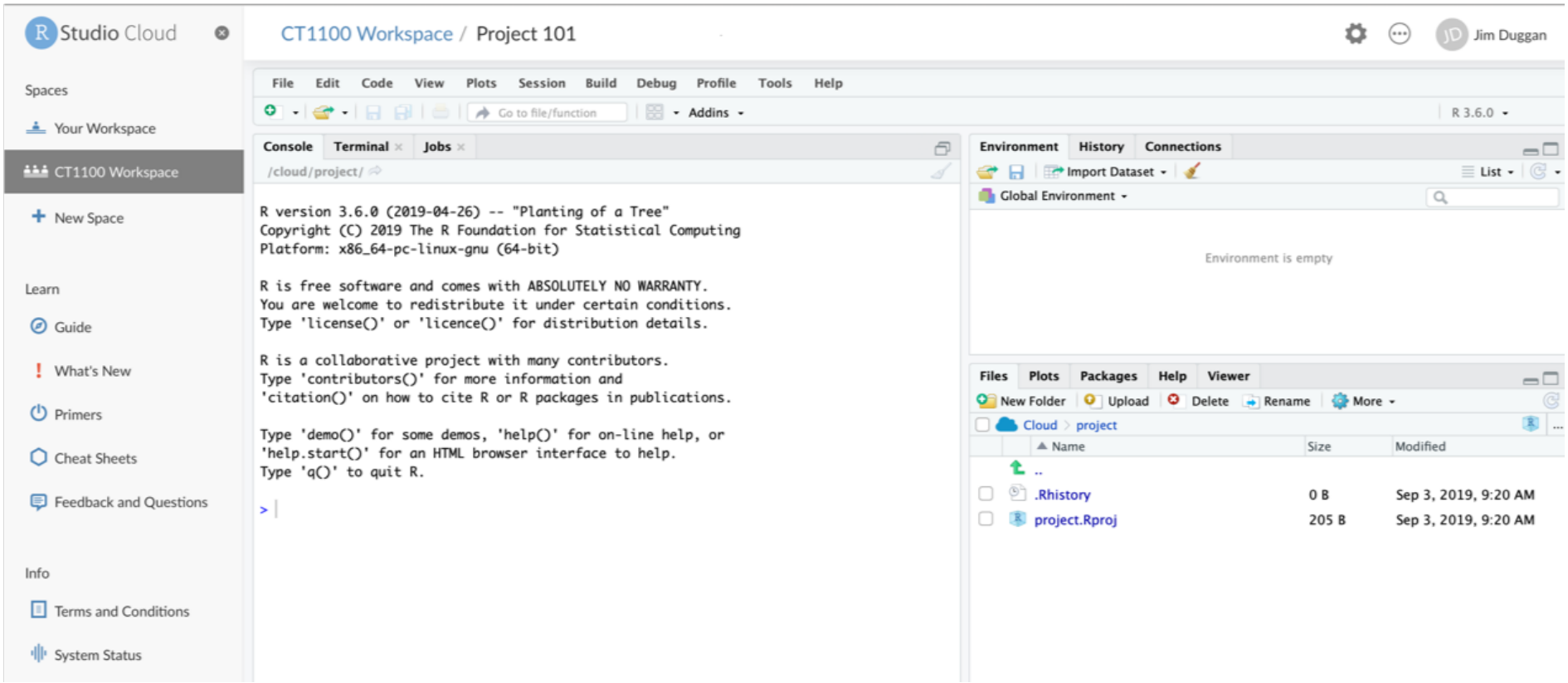
Setup an Account on rstudio.cloud



Create a project

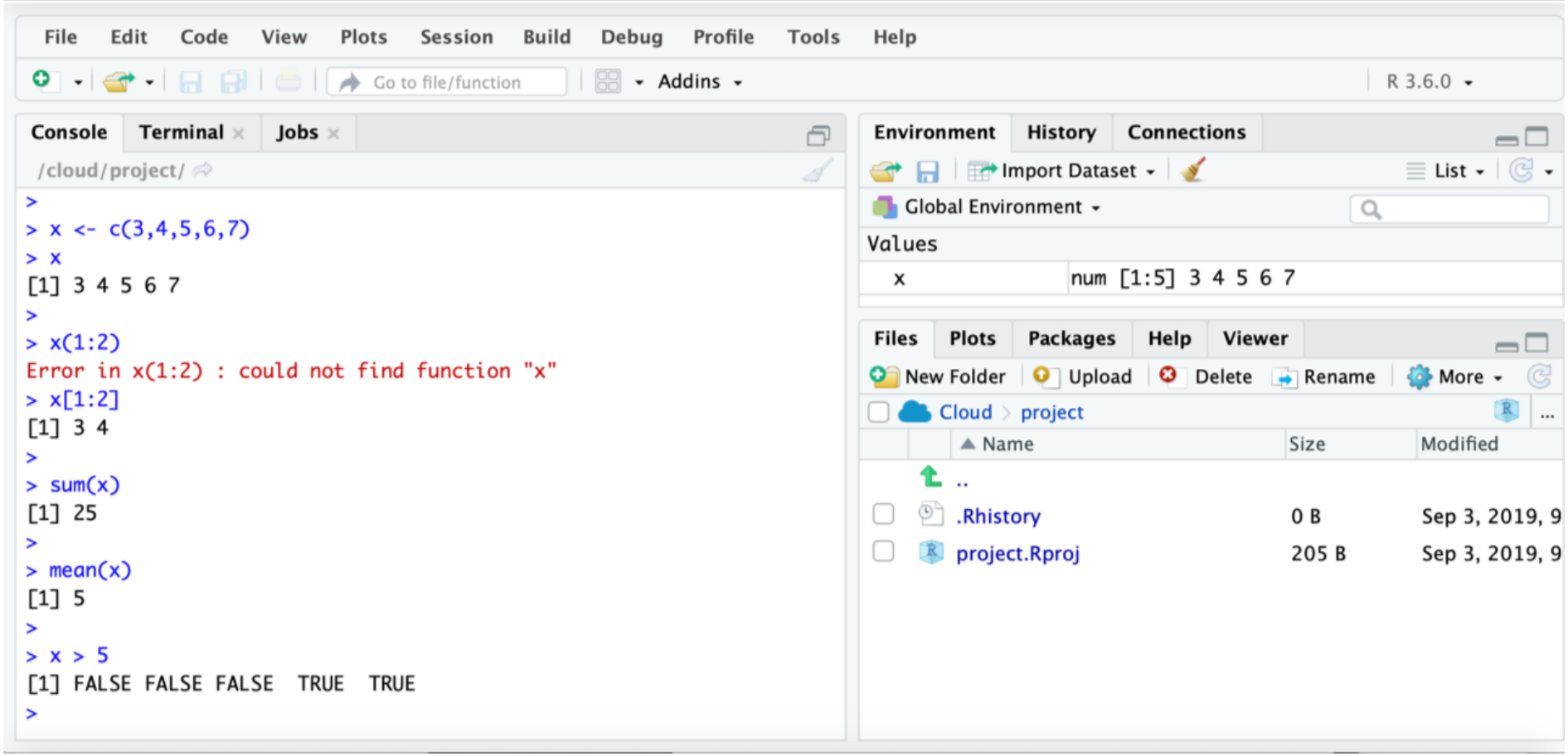


RStudio ready for use

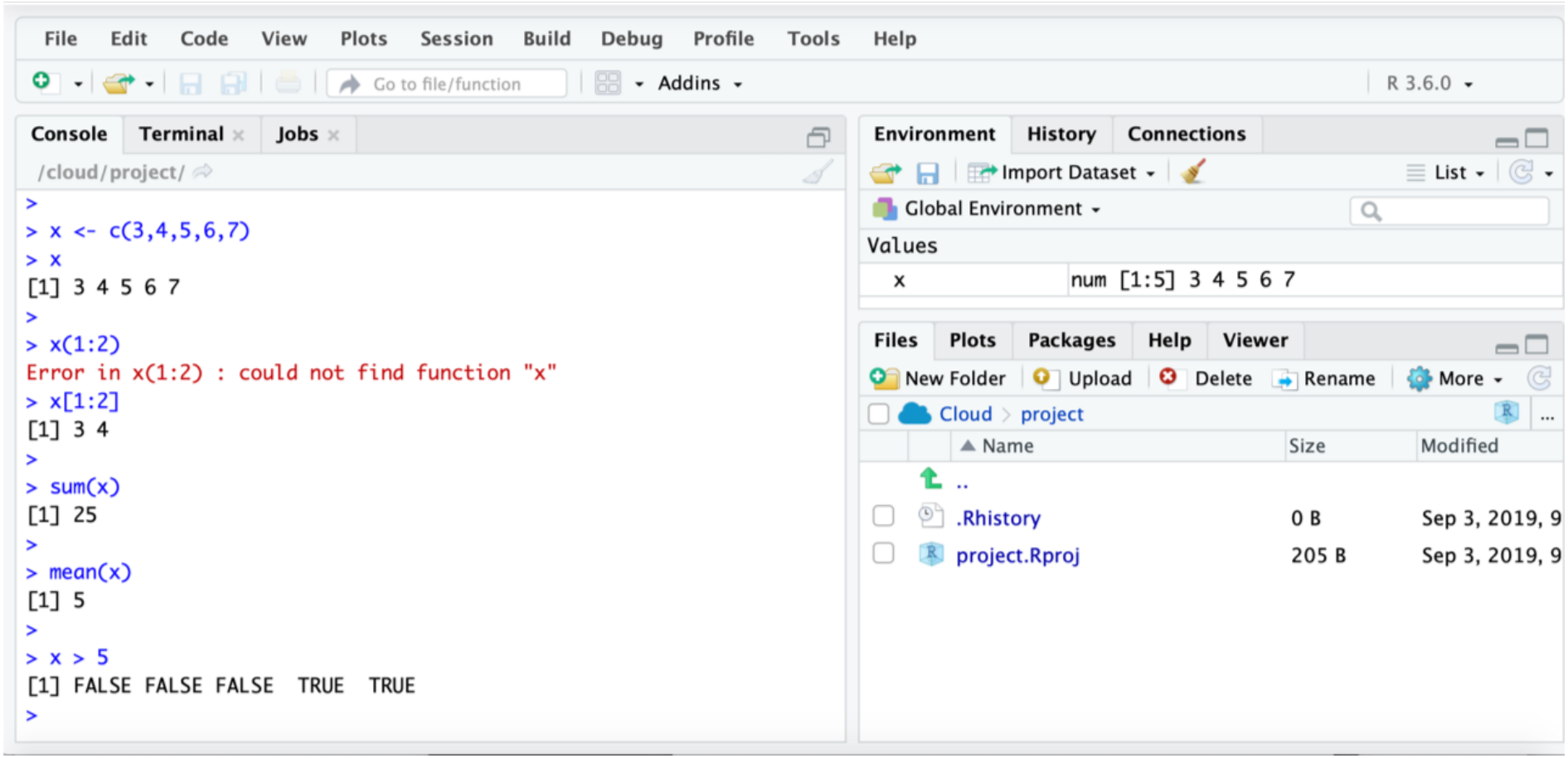


Run code in console.

- x is data!
- R allows you process the data with function calls



Challange 1.1 - Replicate the following in RStudio Cloud



Summary

- Welcome to CT1100
- Semester 1
  - Practical focus - understanding and manipulating data
  - Using RStudio Cloud
- Next Week
  - Input - Process - Output
  - Binary data
  - More on R (atomic vectors)