

Connecting data, analysis, and results using a reproducible framework

Mine Çetinkaya-Rundel & Nicholas Horton

USCOTS 2015

Materials:

- Slides at http://bit.ly/reproduce_uscots15_slides
- For GitHub users: all source code at http://bit.ly/reproduce_uscots15_git

Agenda for hands-on portions of the workshop:

- Exercise 1: Dataset at http://bit.ly/reproduce_uscots15_gap5060
- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-01.oit.duke.edu:49431>
 - Username: guest
 - Password: f4CqvU2VjU
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
 - Yes → Install and load `knitr`, `ggplot2`, and `downloader` packages

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install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-01.oit.duke.edu:49432>
 - Username: guest
 - Password: N7e8cujojQ
 - This account will work until the end of today
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 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-01.oit.duke.edu:49433>
 - Username: guest
 - Password: 5qTOnvGFto
 - This account will work until the end of today
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 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-01.oit.duke.edu:49434>
 - Username: guest
 - Password: RwcsZUnfks
 - This account will work until the end of today
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 - Go to <http://rstudio-docker-01.oit.duke.edu:49435>
 - Username: guest
 - Password: rezuc3CKB8
 - This account will work until the end of today
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 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-01.oit.duke.edu:49436>
 - Username: guest
 - Password: GxNMFaGCvM
 - This account will work until the end of today
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 - Go to <http://rstudio-docker-01.oit.duke.edu:49438>
 - Username: guest
 - Password: jKAAJruAVs
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 - Go to <http://rstudio-docker-01.oit.duke.edu:49439>
 - Username: guest
 - Password: hvpLXooitE
 - This account will work until the end of today
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 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49620>
 - Username: guest
 - Password: jHFk78Qsds
 - This account will work until the end of today
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 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49621>
 - Username: guest
 - Password: BlQbzSEoyY
 - This account will work until the end of today
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 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49622>
 - Username: guest
 - Password: MD7R7zBioY
 - This account will work until the end of today
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 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49624>
 - Username: guest
 - Password: vseWUOxWO0
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 - Go to <http://rstudio-docker-02.oit.duke.edu:49625>
 - Username: guest
 - Password: Qx94qNOWkA
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 - Go to <http://rstudio-docker-02.oit.duke.edu:49626>
 - Username: guest
 - Password: GPmtXNoOjo
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 - Go to <http://rstudio-docker-02.oit.duke.edu:49627>
 - Username: guest
 - Password: tQdk22ZbEE
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 - Username: guest
 - Password: qwgowoyMYY
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install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

Questions / Connections: Feel free to contact Mine at mine@stat.duke.edu after the workshop with any questions.

Connecting data, analysis, and results using a reproducible framework

Mine Çetinkaya-Rundel & Nicholas Horton

USCOTS 2015

Materials:

- Slides at http://bit.ly/reproduce_uscots15_slides
- For GitHub users: all source code at http://bit.ly/reproduce_uscots15_git

Agenda for hands-on portions of the workshop:

- Exercise 1: Dataset at http://bit.ly/reproduce_uscots15_gap5060
- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49629>
 - Username: guest
 - Password: CQTL0AezSM
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
 - Yes → Install and load `knitr`, `ggplot2`, and `downloader` packages

```
install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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USCOTS 2015

Materials:

- Slides at http://bit.ly/reproduce_uscots15_slides
- For GitHub users: all source code at http://bit.ly/reproduce_uscots15_git

Agenda for hands-on portions of the workshop:

- Exercise 1: Dataset at http://bit.ly/reproduce_uscots15_gap5060
- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-03.oit.duke.edu:49820>
 - Username: guest
 - Password: cbrSj26AWE
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
 - Yes → Install and load `knitr`, `ggplot2`, and `downloader` packages

```
install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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USCOTS 2015

Materials:

- Slides at http://bit.ly/reproduce_uscots15_slides
- For GitHub users: all source code at http://bit.ly/reproduce_uscots15_git

Agenda for hands-on portions of the workshop:

- Exercise 1: Dataset at http://bit.ly/reproduce_uscots15_gap5060
- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-03.oit.duke.edu:49821>
 - Username: guest
 - Password: fpRqG1Pq0o
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
 - Yes → Install and load `knitr`, `ggplot2`, and `downloader` packages

```
install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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Agenda for hands-on portions of the workshop:

- Exercise 1: Dataset at http://bit.ly/reproduce_uscots15_gap5060
- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-03.oit.duke.edu:49822>
 - Username: guest
 - Password: OTBZb5GeTs
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
 - Yes → Install and load `knitr`, `ggplot2`, and `downloader` packages

```
install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-03.oit.duke.edu:49823>
 - Username: guest
 - Password: EV3tK9zJtE
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
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install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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Agenda for hands-on portions of the workshop:

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- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-03.oit.duke.edu:49824>
 - Username: guest
 - Password: 25Nt40e3ps
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
 - Yes → Install and load `knitr`, `ggplot2`, and `downloader` packages

```
install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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USCOTS 2015

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- For GitHub users: all source code at http://bit.ly/reproduce_uscots15_git

Agenda for hands-on portions of the workshop:

- Exercise 1: Dataset at http://bit.ly/reproduce_uscots15_gap5060
- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-03.oit.duke.edu:49825>
 - Username: guest
 - Password: Br3OMyM05I
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
 - Yes → Install and load `knitr`, `ggplot2`, and `downloader` packages

```
install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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- Exercise 1: Dataset at http://bit.ly/reproduce_uscots15_gap5060
- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-03.oit.duke.edu:49826>
 - Username: guest
 - Password: 4phgPp3pAc
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
 - Yes → Install and load `knitr`, `ggplot2`, and `downloader` packages

```
install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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- For GitHub users: all source code at http://bit.ly/reproduce_uscots15_git

Agenda for hands-on portions of the workshop:

- Exercise 1: Dataset at http://bit.ly/reproduce_uscots15_gap5060
- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-03.oit.duke.edu:49827>
 - Username: guest
 - Password: wHr47zHDHM
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
 - Yes → Install and load `knitr`, `ggplot2`, and `downloader` packages

```
install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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USCOTS 2015

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- Slides at http://bit.ly/reproduce_uscots15_slides
- For GitHub users: all source code at http://bit.ly/reproduce_uscots15_git

Agenda for hands-on portions of the workshop:

- Exercise 1: Dataset at http://bit.ly/reproduce_uscots15_gap5060
- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-03.oit.duke.edu:49828>
 - Username: guest
 - Password: 8Kfx98V4UE
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
 - Yes → Install and load `knitr`, `ggplot2`, and `downloader` packages

```
install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-03.oit.duke.edu:49829>
 - Username: guest
 - Password: Ll44QLJKsk
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
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install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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- Exercise 1: Dataset at http://bit.ly/reproduce_uscots15_gap5060
- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-01.oit.duke.edu:49441>
 - Username: guest
 - Password: FHf8GDrAu8
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
 - Yes → Install and load `knitr`, `ggplot2`, and `downloader` packages

```
install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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USCOTS 2015

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- Exercise 1: Dataset at http://bit.ly/reproduce_uscots15_gap5060
- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-01.oit.duke.edu:49442>
 - Username: guest
 - Password: BPBFVuSTxE
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
 - Yes → Install and load `knitr`, `ggplot2`, and `downloader` packages

```
install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-01.oit.duke.edu:49443>
 - Username: guest
 - Password: NTPdQmlgr0
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
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install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-01.oit.duke.edu:49444>
 - Username: guest
 - Password: GkqdsYyndc
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
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install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-01.oit.duke.edu:49445>
 - Username: guest
 - Password: n0EvTydz44
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
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install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-01.oit.duke.edu:49446>
 - Username: guest
 - Password: a5QaHCQU78
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
 - Yes → Install and load `knitr`, `ggplot2`, and `downloader` packages

```
install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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Connecting data, analysis, and results using a reproducible framework

Mine Çetinkaya-Rundel & Nicholas Horton

USCOTS 2015

Materials:

- Slides at http://bit.ly/reproduce_uscots15_slides
- For GitHub users: all source code at http://bit.ly/reproduce_uscots15_git

Agenda for hands-on portions of the workshop:

- Exercise 1: Dataset at http://bit.ly/reproduce_uscots15_gap5060
- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-01.oit.duke.edu:49447>
 - Username: guest
 - Password: XEq6rNIAyg
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
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install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

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download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
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- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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- Exercise 1: Dataset at http://bit.ly/reproduce_uscots15_gap5060
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 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-01.oit.duke.edu:49448>
 - Username: guest
 - Password: OKuBzN9YO0
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
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 - Go to <http://rstudio-docker-01.oit.duke.edu:49449>
 - Username: guest
 - Password: xm38QYCV0s
 - This account will work until the end of today
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 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49630>
 - Username: guest
 - Password: mmOl9djDqI
 - This account will work until the end of today
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 - Go to <http://rstudio-docker-02.oit.duke.edu:49631>
 - Username: guest
 - Password: mYYr4Vl2qw
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
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 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49632>
 - Username: guest
 - Password: 3CPSSnrIzkI
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
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```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49633>
 - Username: guest
 - Password: KbRk0LDfoY
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
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```
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```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49634>
 - Username: guest
 - Password: n7vhAgv4A
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
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```
install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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- For GitHub users: all source code at http://bit.ly/reproduce_uscots15_git

Agenda for hands-on portions of the workshop:

- Exercise 1: Dataset at http://bit.ly/reproduce_uscots15_gap5060
- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49635>
 - Username: guest
 - Password: 6XiTstOBQA
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
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install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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Connecting data, analysis, and results using a reproducible framework

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USCOTS 2015

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- For GitHub users: all source code at http://bit.ly/reproduce_uscots15_git

Agenda for hands-on portions of the workshop:

- Exercise 1: Dataset at http://bit.ly/reproduce_uscots15_gap5060
- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49636>
 - Username: guest
 - Password: DryuNQZM3Y
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
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```
install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49638>
 - Username: guest
 - Password: KxnSYCaOTI
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
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download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49639>
 - Username: guest
 - Password: BFJj40WW98
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
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```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
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 - Go to <http://rstudio-docker-03.oit.duke.edu:49830>
 - Username: guest
 - Password: wxbOZmf6Qc
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 - Password: DEE1WThk9o
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 - Go to <http://rstudio-docker-03.oit.duke.edu:49832>
 - Username: guest
 - Password: WujcagF5GM
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download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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Connecting data, analysis, and results using a reproducible framework

Mine Çetinkaya-Rundel & Nicholas Horton

USCOTS 2015

Materials:

- Slides at http://bit.ly/reproduce_uscots15_slides
- For GitHub users: all source code at http://bit.ly/reproduce_uscots15_git

Agenda for hands-on portions of the workshop:

- Exercise 1: Dataset at http://bit.ly/reproduce_uscots15_gap5060
- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-03.oit.duke.edu:49834>
 - Username: guest
 - Password: VhhSqzZQGk
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
 - Yes → Install and load `knitr`, `ggplot2`, and `downloader` packages

```
install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-03.oit.duke.edu:49835>
 - Username: guest
 - Password: QpGiC0CauA
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
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install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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Agenda for hands-on portions of the workshop:

- Exercise 1: Dataset at http://bit.ly/reproduce_uscots15_gap5060
- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-03.oit.duke.edu:49836>
 - Username: guest
 - Password: V3SP3CsvCE
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
 - Yes → Install and load `knitr`, `ggplot2`, and `downloader` packages

```
install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-03.oit.duke.edu:49837>
 - Username: guest
 - Password: EFcb61ITAQ
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
 - No, or you're not sure → Go to Option 1
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```
install.packages("knitr") ; library("knitr")
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install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-03.oit.duke.edu:49839>
 - Username: guest
 - Password: 8uTXNE90Lc
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
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install.packages("knitr") ; library("knitr")
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install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
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- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49640>
 - Username: guest
 - Password: ug3NX4BR5I
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
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install.packages("knitr") ; library("knitr")
install.packages("ggplot2") ; library("ggplot2")
install.packages("downloader") ; library("downloader")
```

* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49641>
 - Username: guest
 - Password: ico2RJl40U
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
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* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49642>
 - Username: guest
 - Password: FK4nYgwrff
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
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* Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

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```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
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 - Go to <http://rstudio-docker-02.oit.duke.edu:49643>
 - Username: guest
 - Password: IcWs3TKgcc
 - This account will work until the end of today
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```

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```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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 - Go to <http://rstudio-docker-02.oit.duke.edu:49644>
 - Username: guest
 - Password: 7iMSEqNBfc
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
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```

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```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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 - Go to <http://rstudio-docker-02.oit.duke.edu:49645>
 - Username: guest
 - Password: pRG2nOlZmU
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```

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download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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 - Username: guest
 - Password: FOQqz60D98
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
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install.packages("downloader") ; library("downloader")
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```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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 - Go to <http://rstudio-docker-02.oit.duke.edu:49647>
 - Username: guest
 - Password: u9OO8T4Asc
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
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install.packages("downloader") ; library("downloader")
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```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
```

- Exercise 2: Download RMarkdown template using

```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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- Revisit Exercise 1: requires RStudio.
 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49648>
 - Username: guest
 - Password: 66skn6P4xg
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
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install.packages("downloader") ; library("downloader")
```

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```
download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
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```
download(url = "http://bit.ly/reproduce_uscots15_ex2", destfile = "ex2-template.Rmd")
```

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 - You have two options for accessing RStudio:
 - * **Option 1: I'm new to R/RStudio:**
 - Go to <http://rstudio-docker-02.oit.duke.edu:49649>
 - Username: guest
 - Password: 8dMUGkbJEc
 - This account will work until the end of today
 - * **Option 2: I already use R/RStudio:** Do you have the **latest** versions of R and RStudio installed locally on your computer?
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download(url = "http://bit.ly/reproduce_uscots15_ex1", destfile = "ex1-template.Rmd")
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```

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