Program-1

P-1 Install R and R studio. Get yourself acquinted with GUI of various working windows of R studio.

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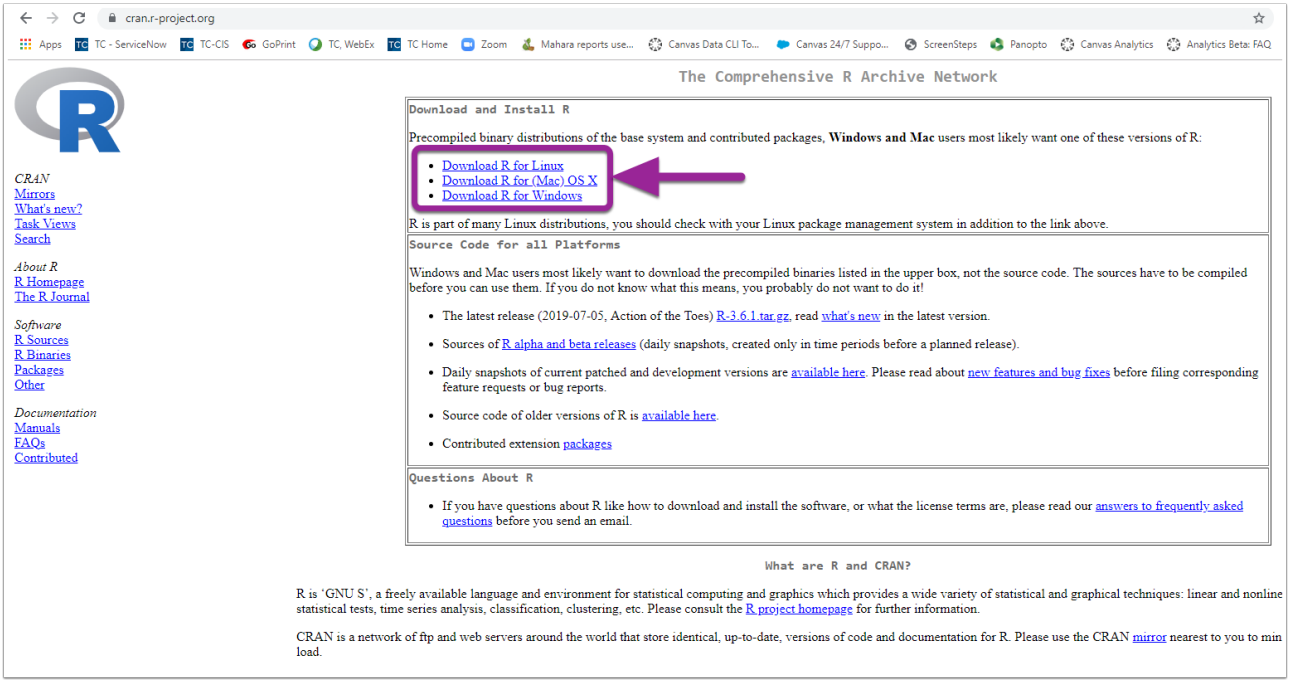
#Roll no. : 200010130051
#Class : B.tech(cse), G-3

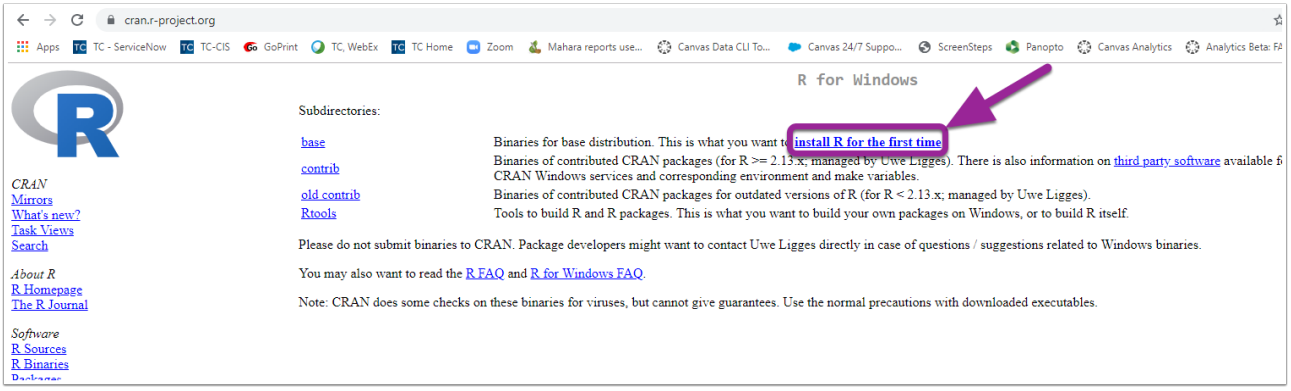
Install R on Windows

1. To install R, go to cran.r-project.org

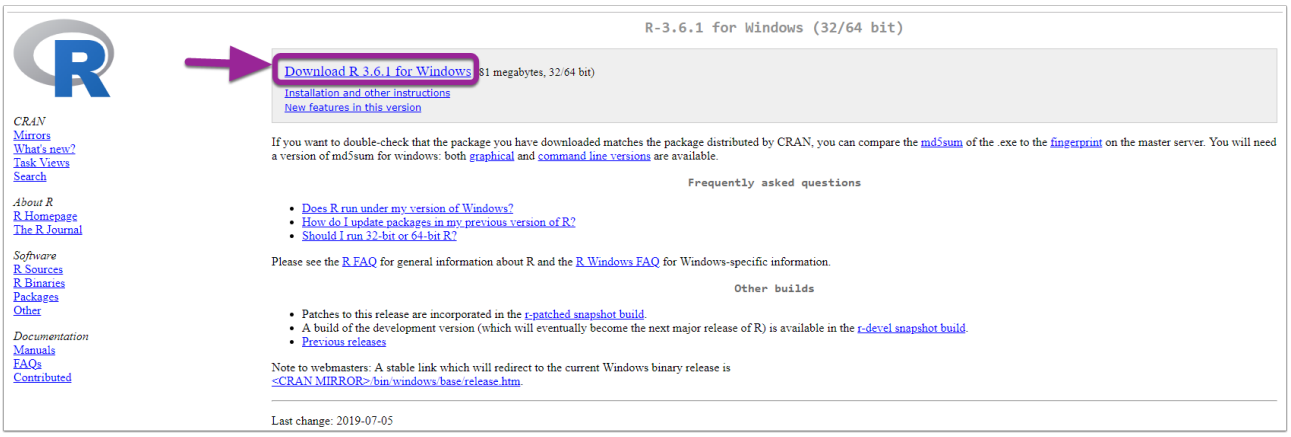
2. Depending on your operating system, click Download R for (your operating system).



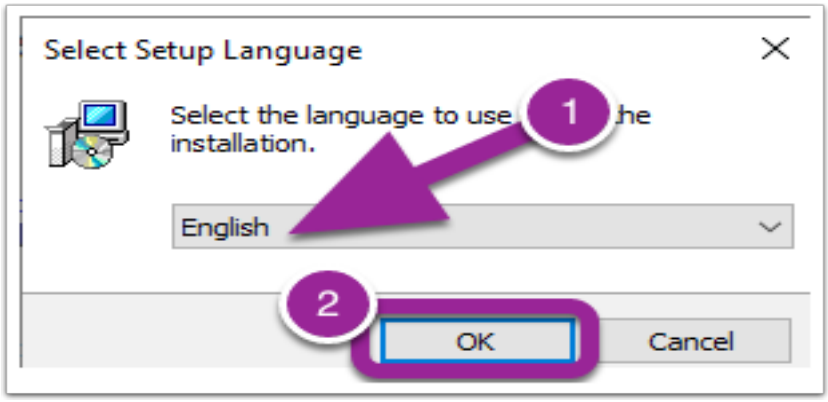
3. Click on install R for the first time.



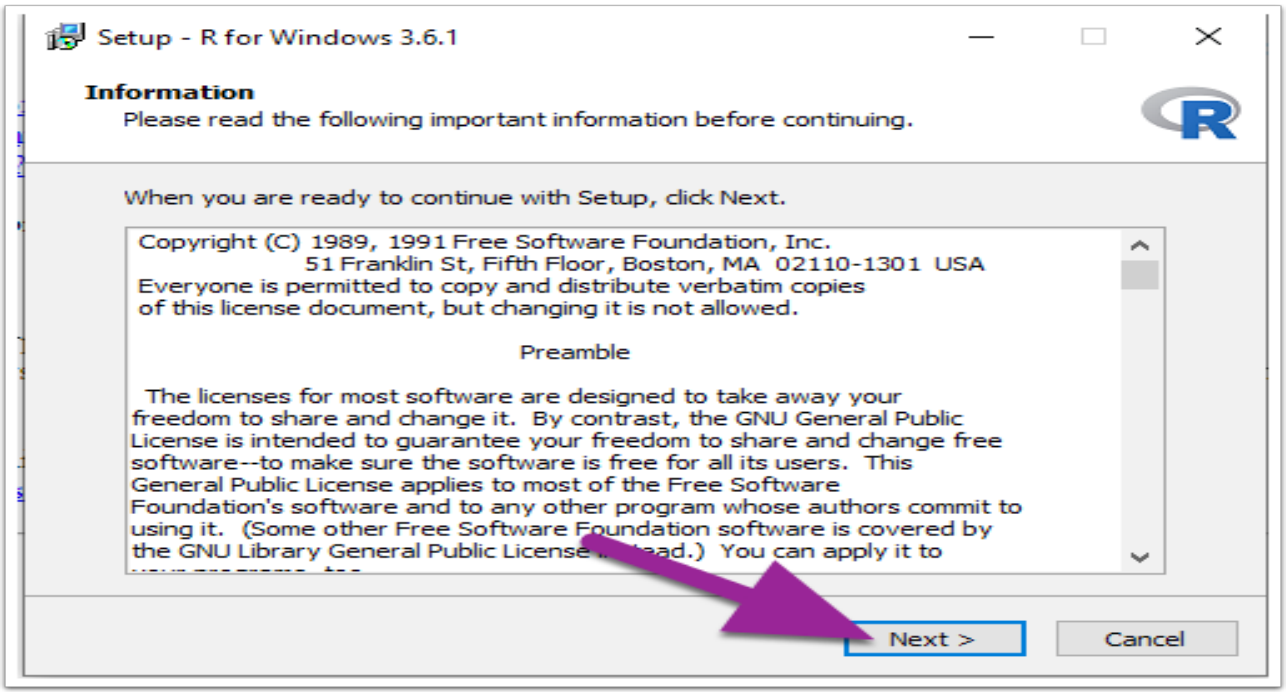
4. Click Download R for Windows. Open the downloaded file.



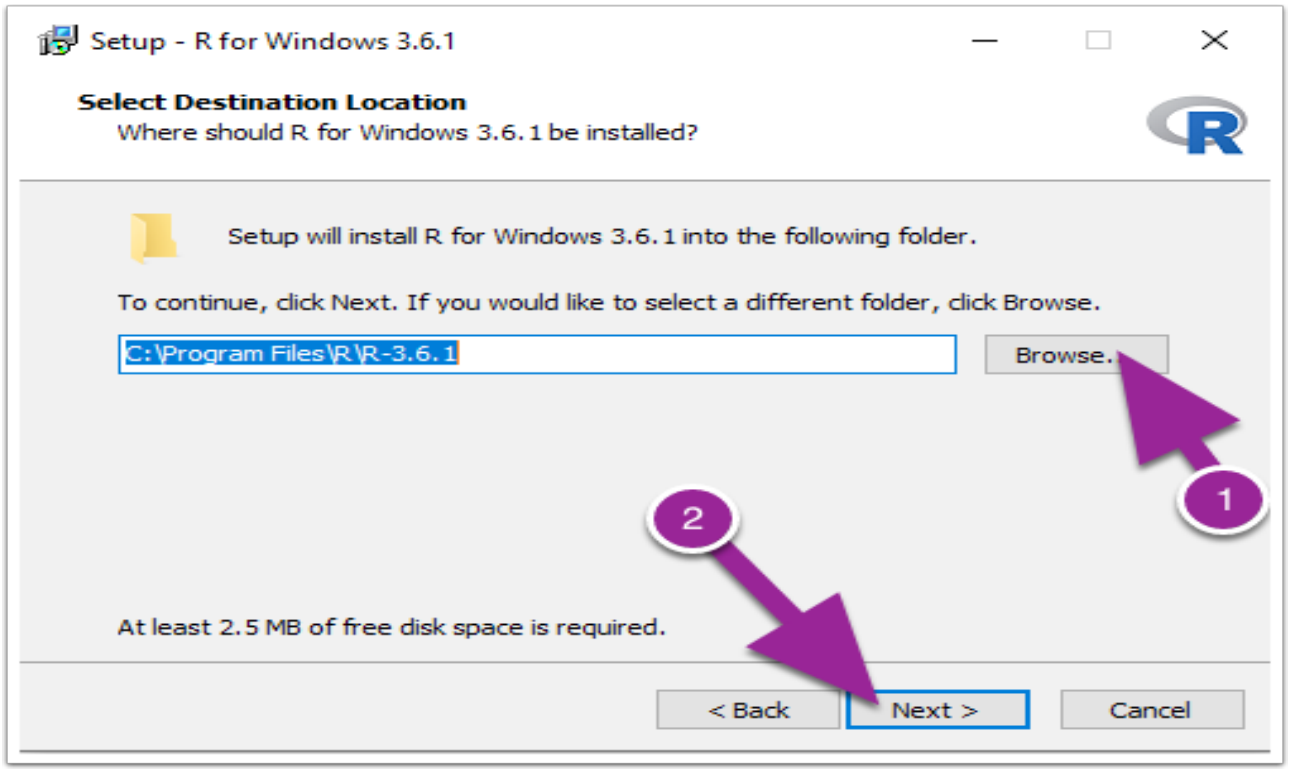
5. Select the language you would like to use during the installation. Then click OK.



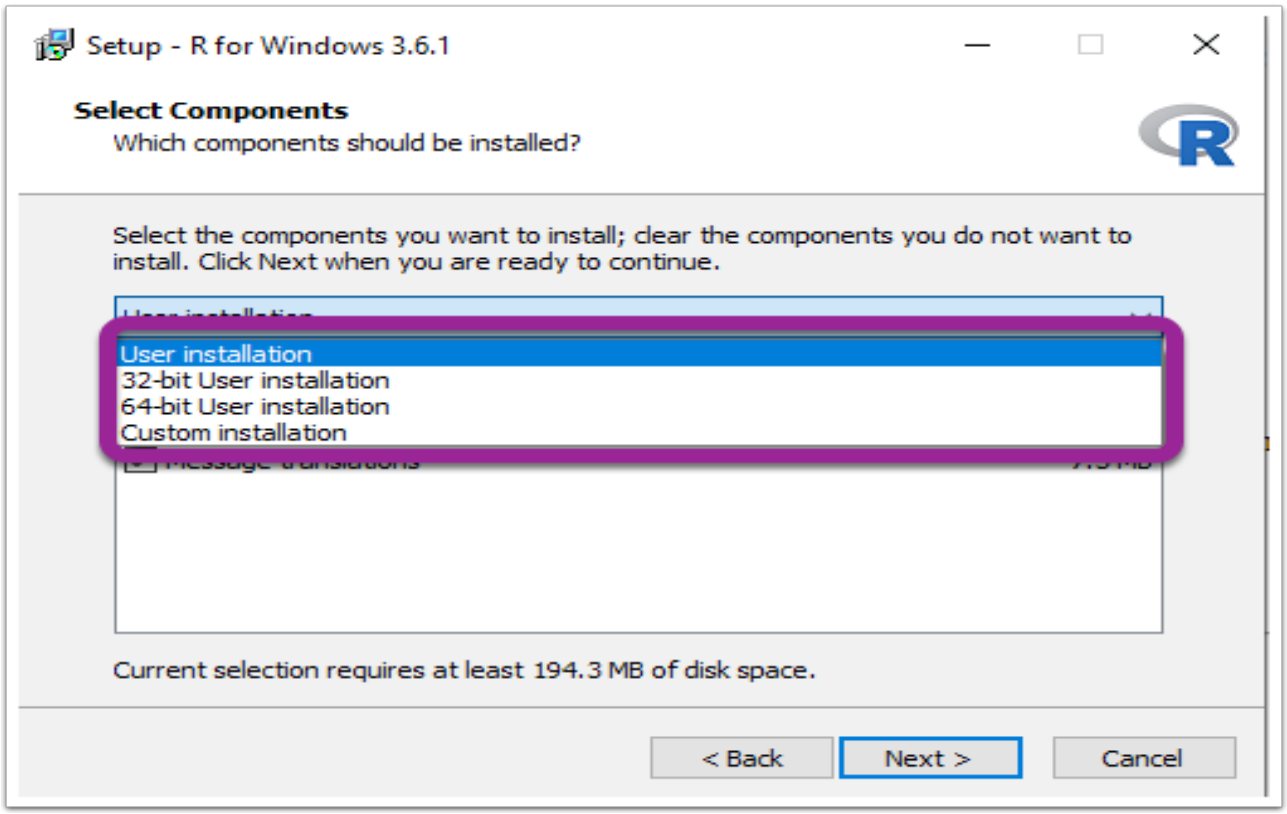
6. Click Next.



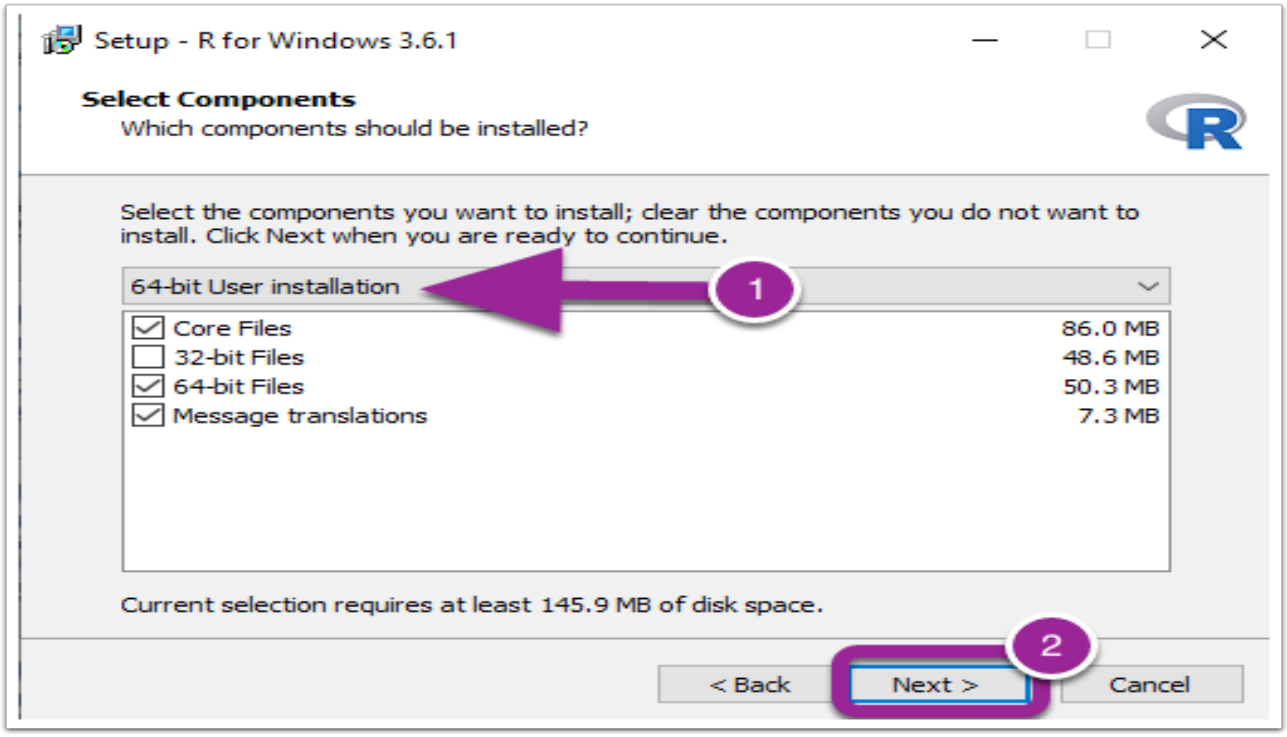
7. Select where you would like R to be installed. It will default to your Program Files on your C Drive. Click Next.



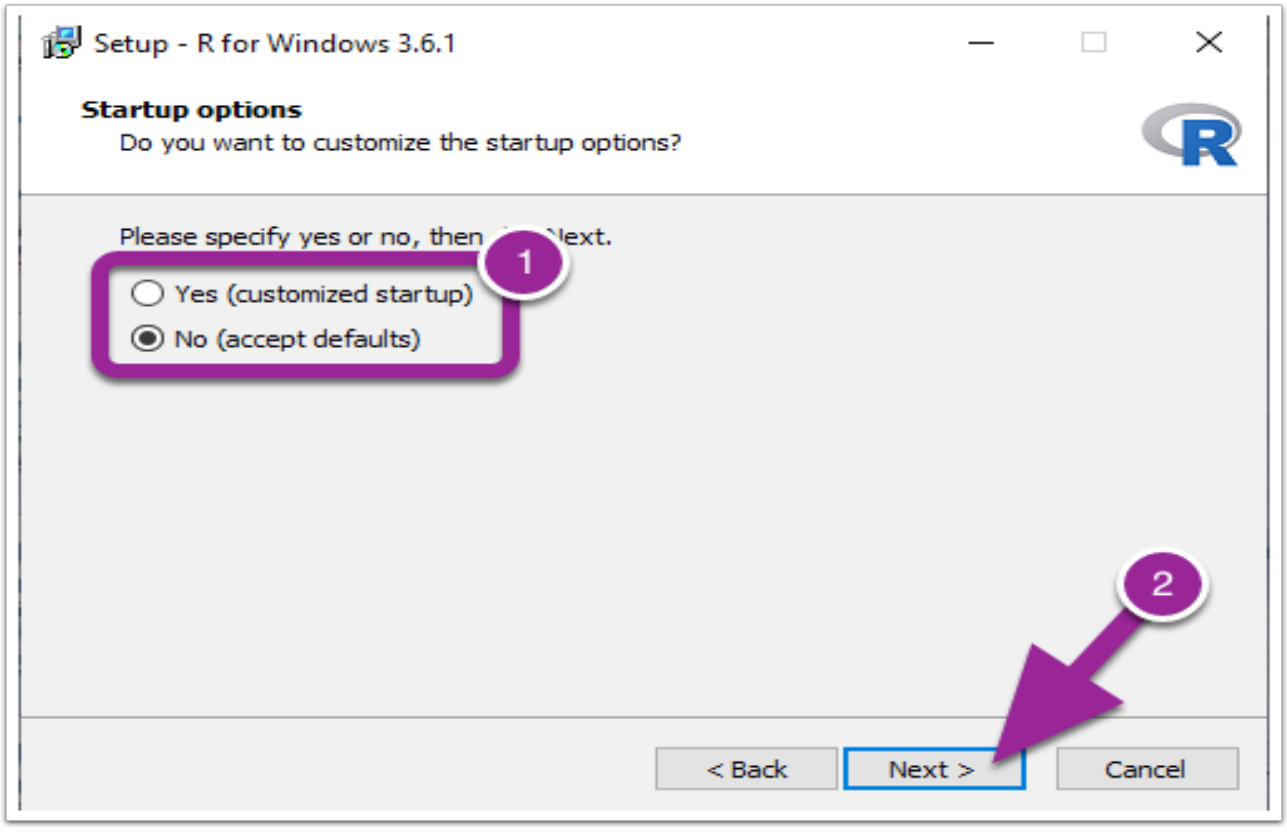
8. You can then choose which installation you would like.



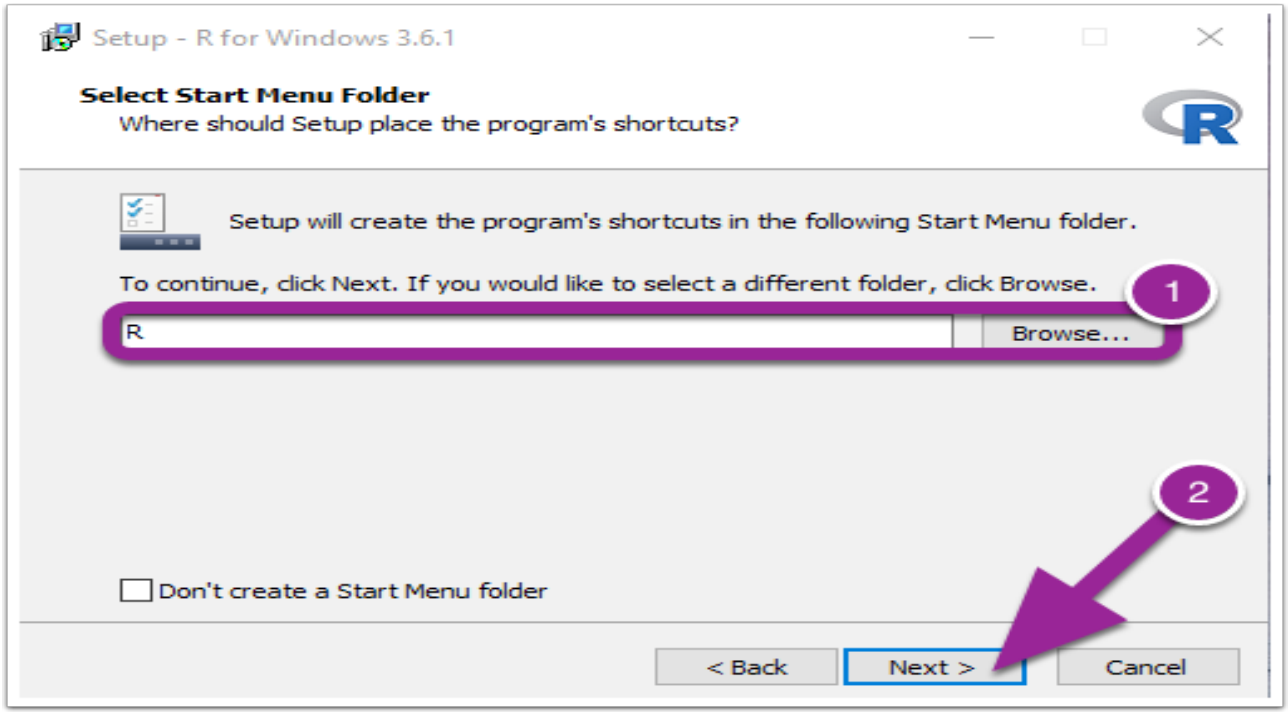
9. (Optional) If your computer is a 64-bit, you can choose the 64-bit User Installation. Then click Next.



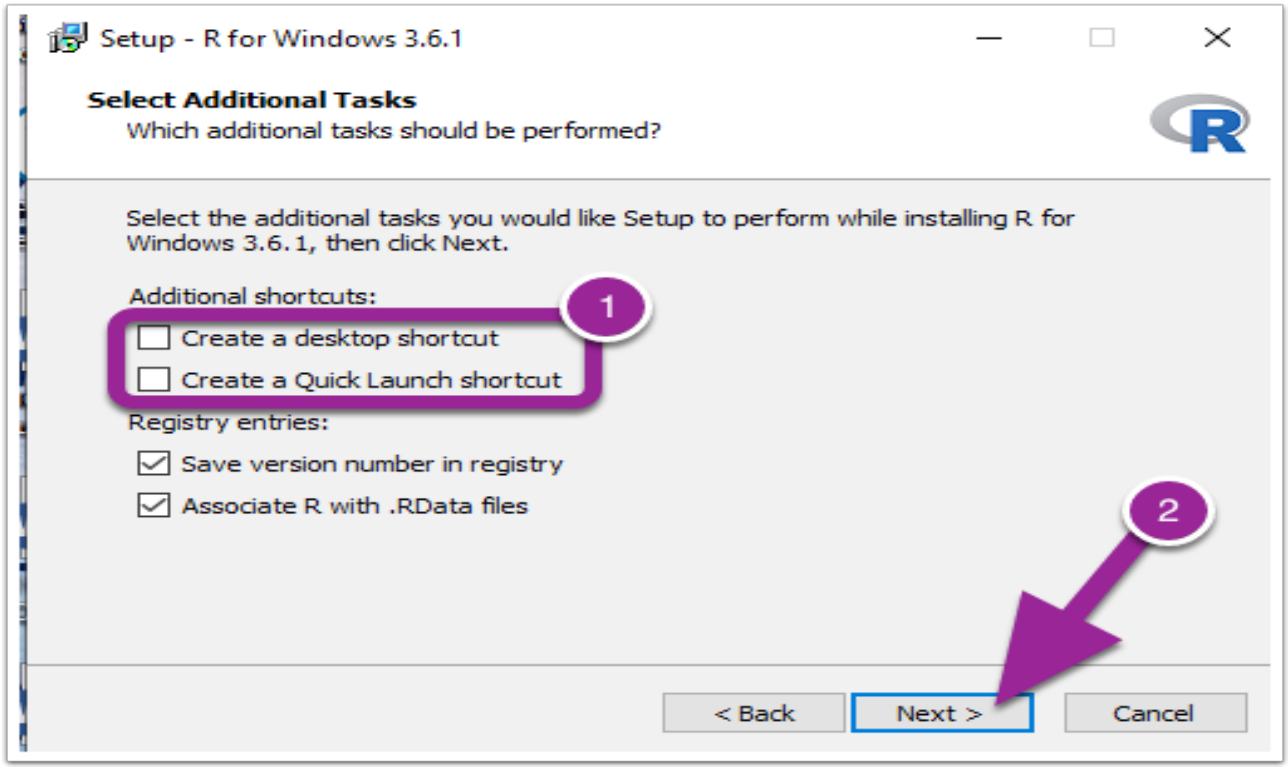
10. Then specify if you want to customized your startup or just use the defaults. Then click Next.



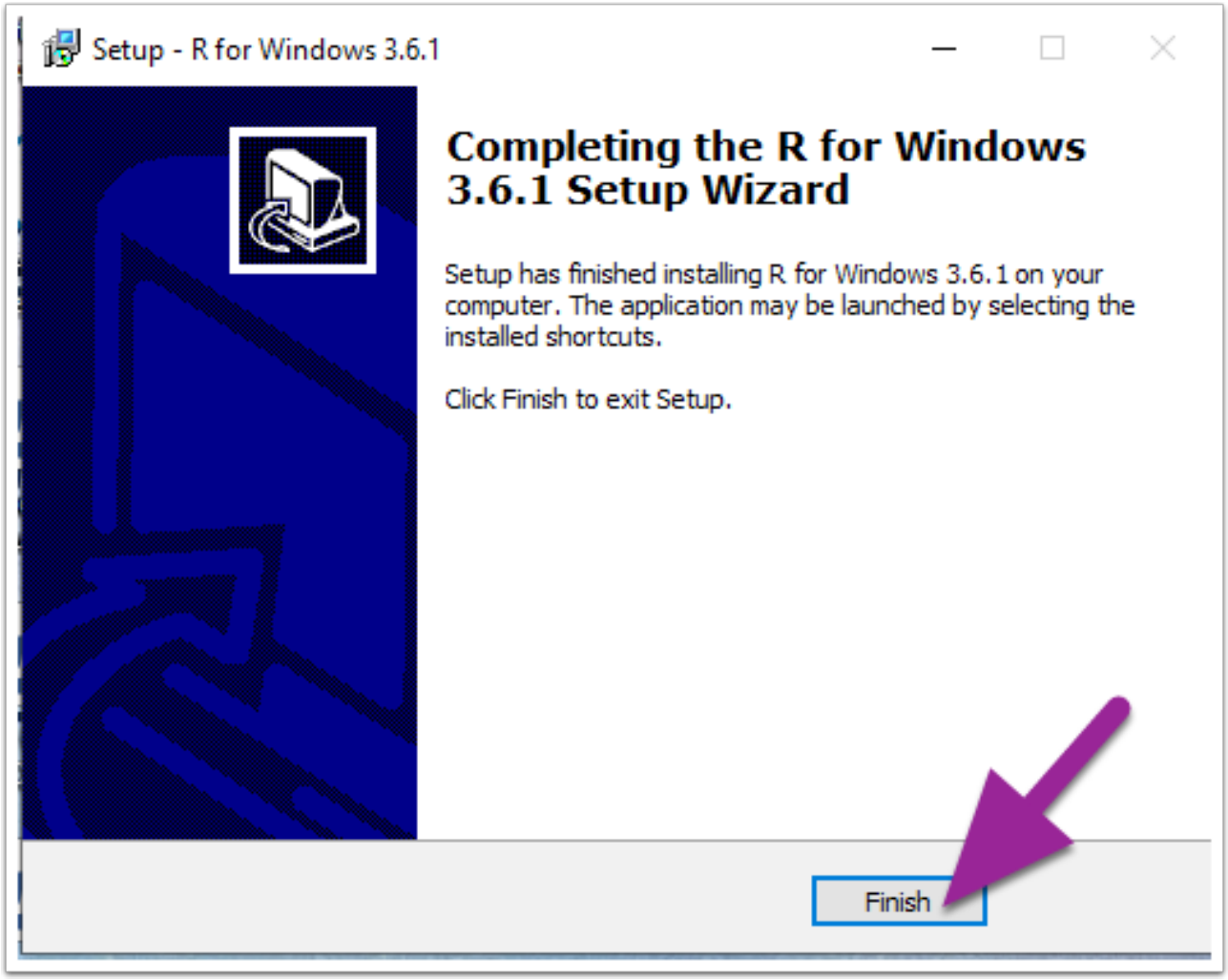
11. Then you can choose the folder that you want R to be saved within or the default if the R folder that was created. Once you have finished, click Next.



12. You can then select additional shortcuts if you would like. Click Next.



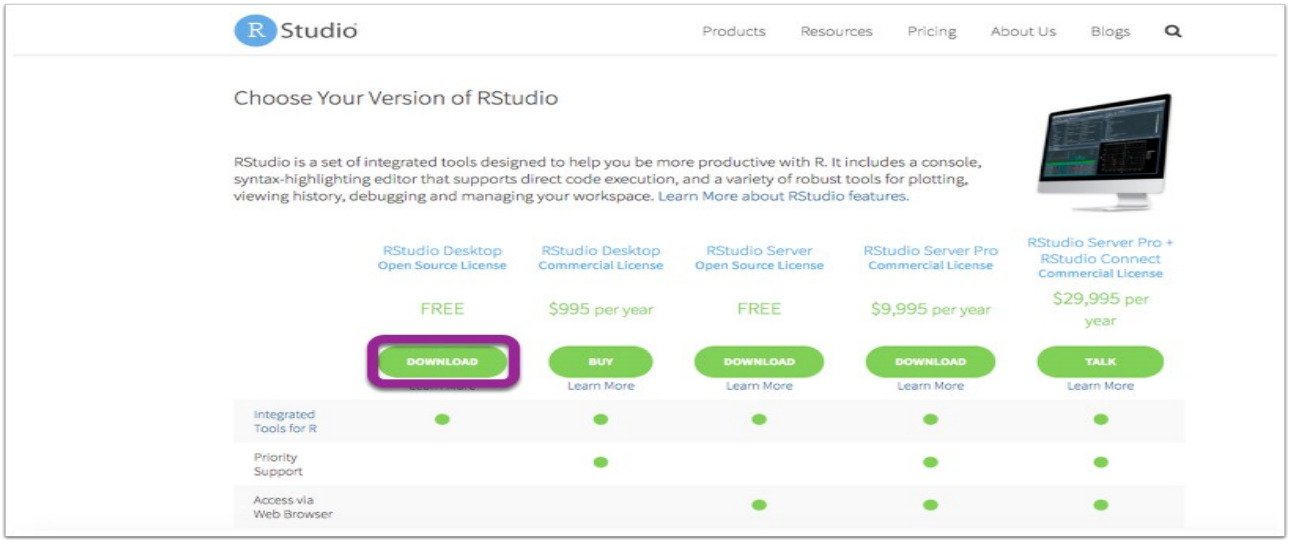
13. Click Finish



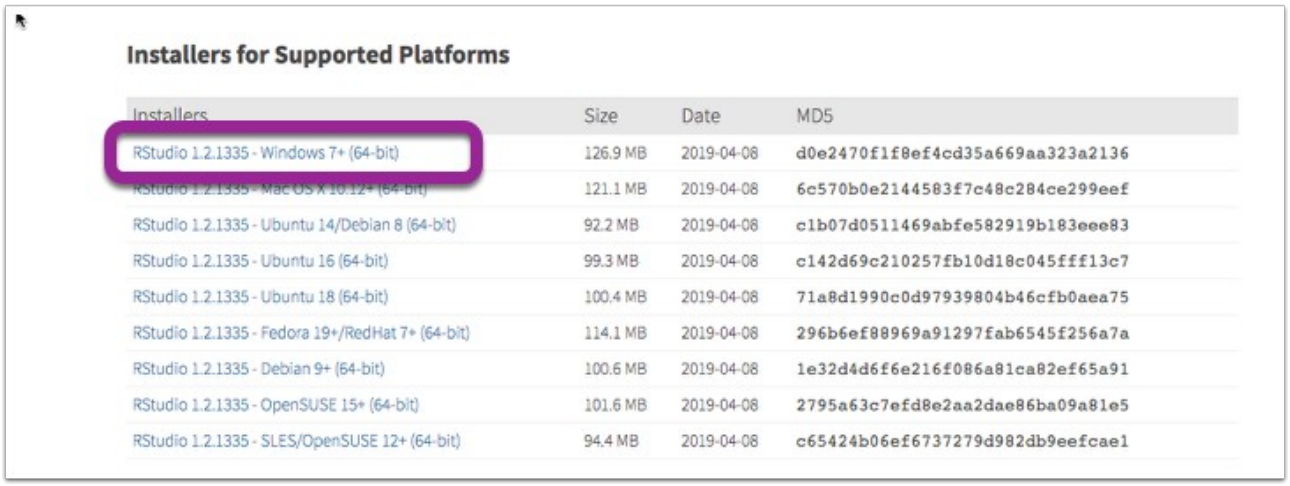
download RStudio. Go to www.rstudio.com

1. Click Download RStudio.

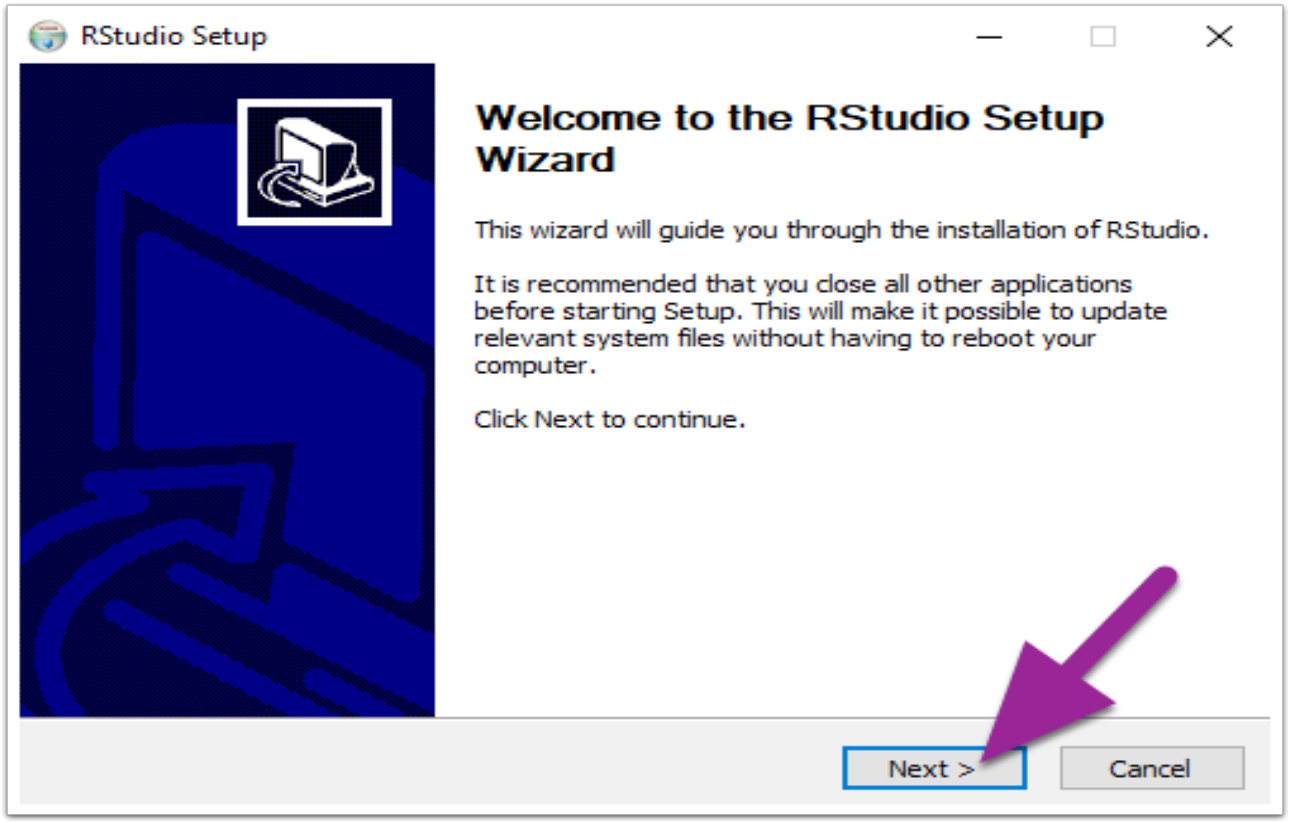
2. Click Download under RStudio Desktop- Open Source License.



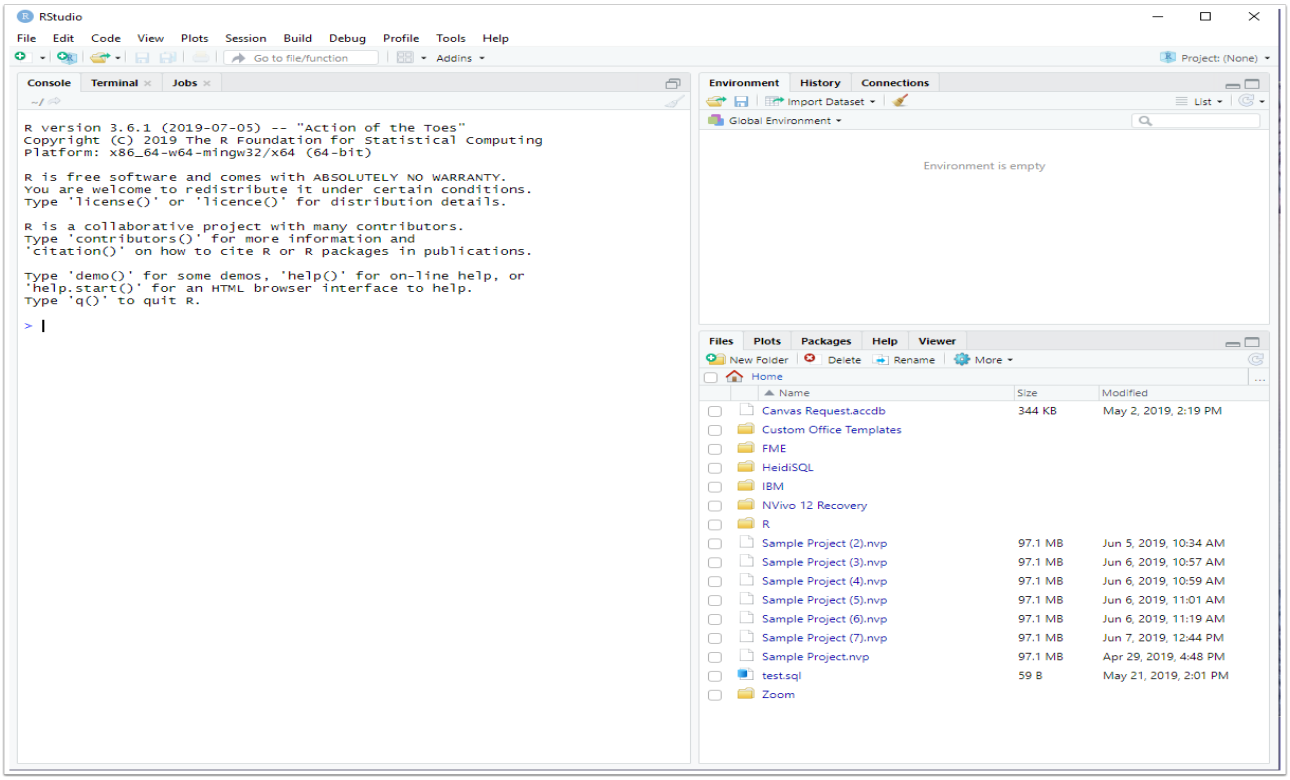
3. Click on the operating system that you are working with.



4. The RStudio installation wizard will pop-up. Click Next and go through the installation steps.



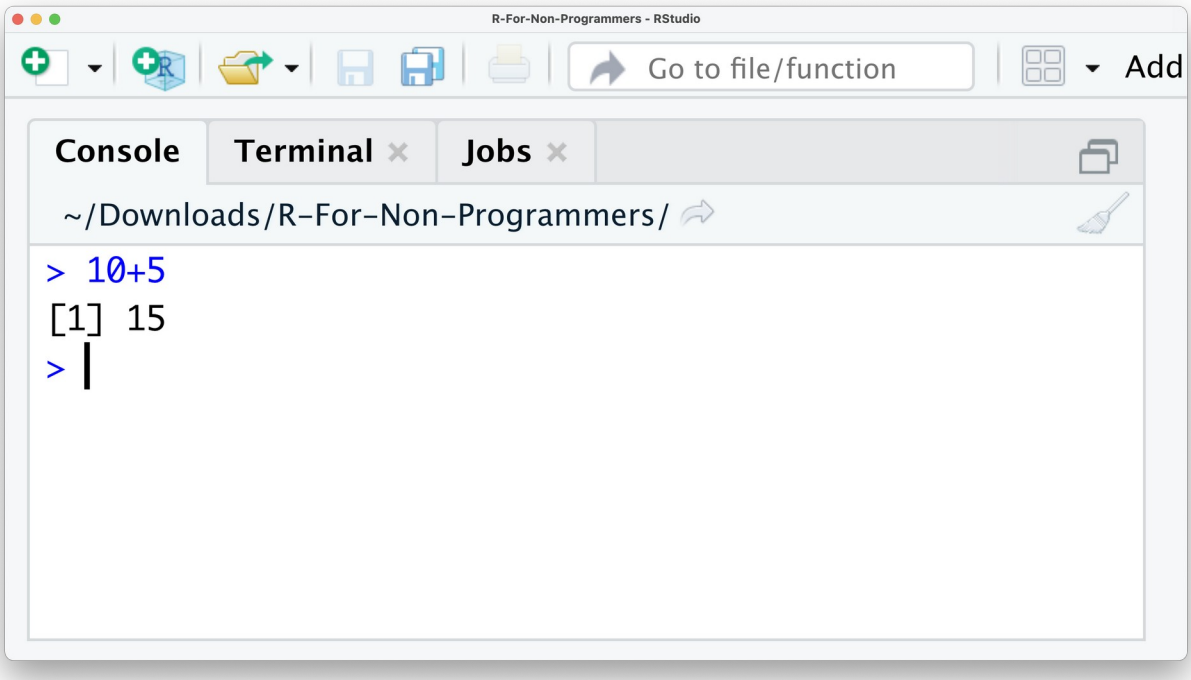
5. Congratulations! You have now installed R and RStudio.



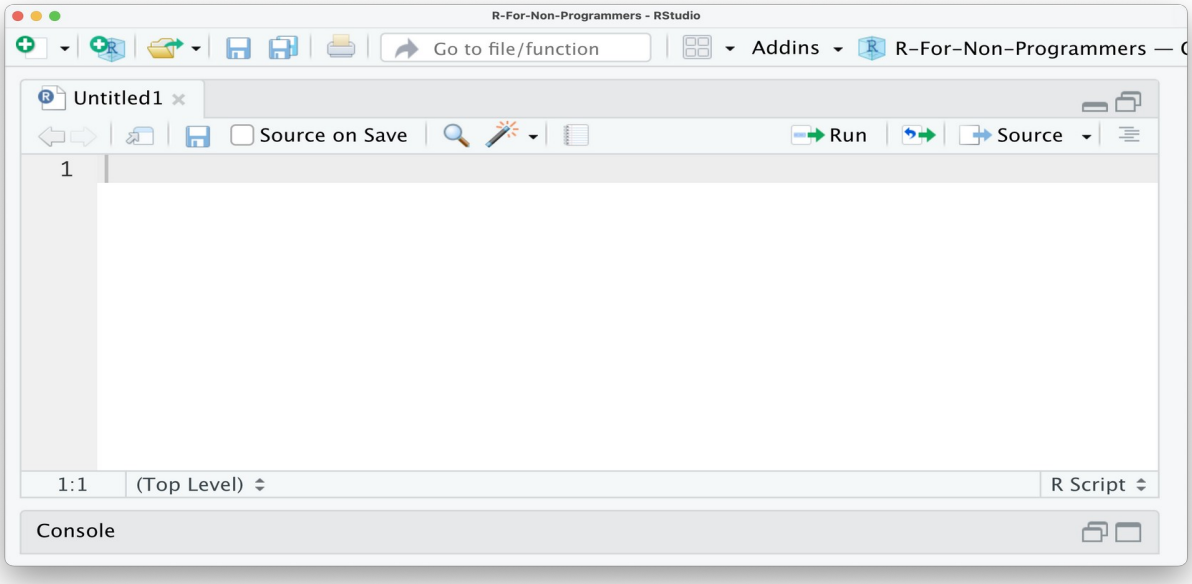
The RStudio Interface

1. The Console window

```
# We type the below into the console
10 + 5
#> [1] 15
```

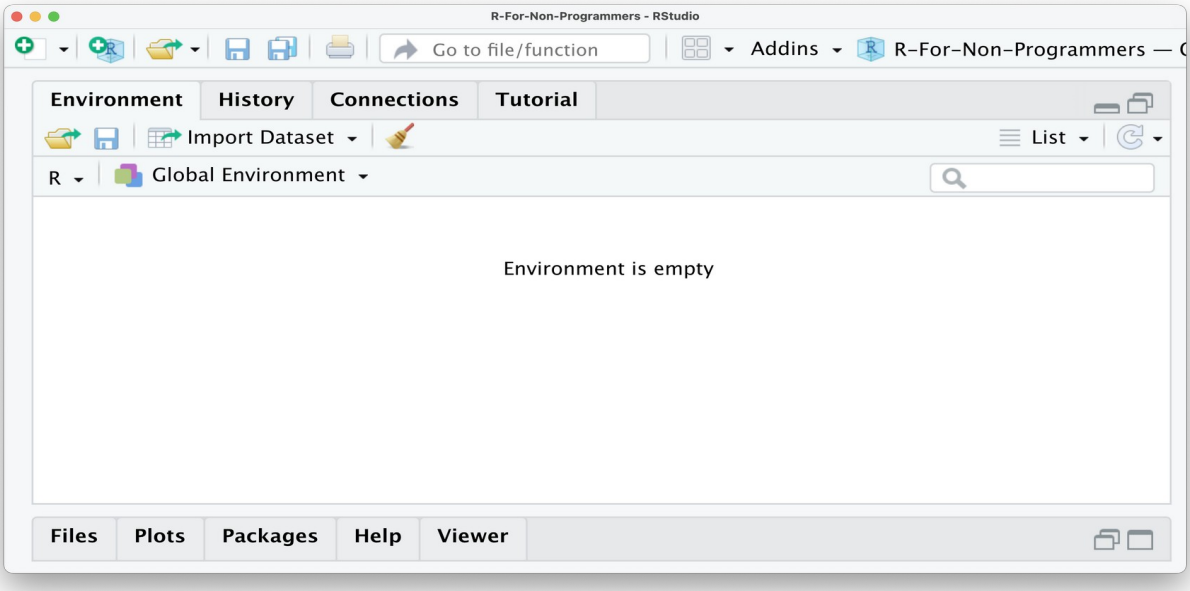


2. The Source window

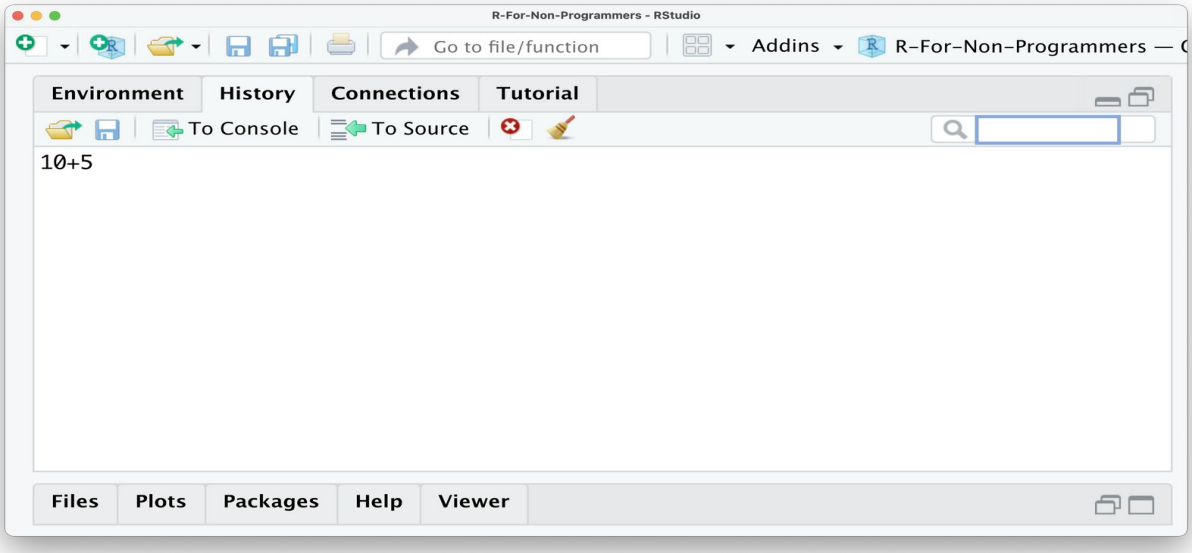


3. The Environment / History / Connections / Tutorial window

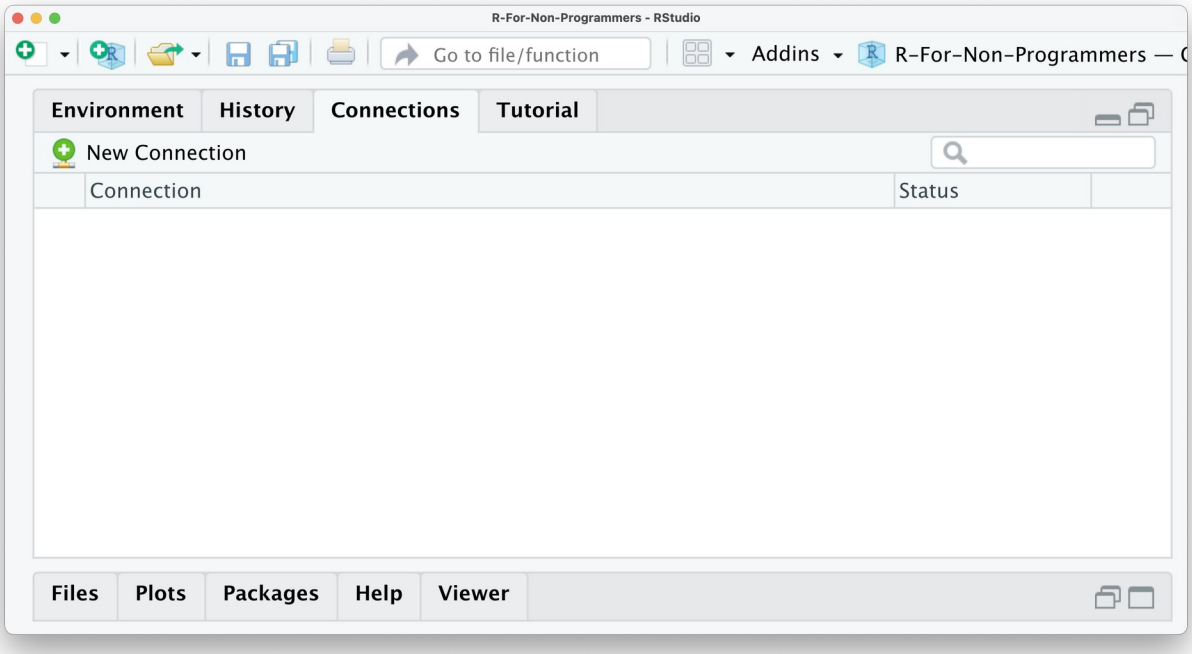
The window in the top right shows multiples panes. The first pane is called *Environment* and shows you objects which are available for computation



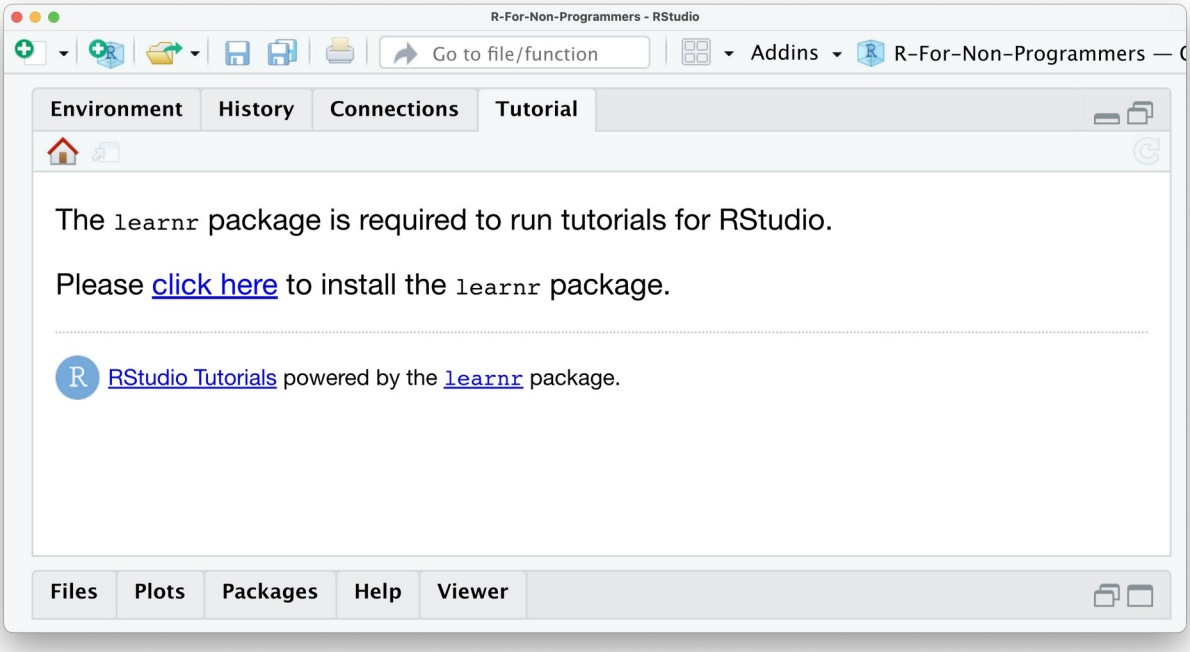
The ***History*** pane is very easy to understand. Whatever computation you run in the console will be stored. So you can go back and see what you coded and rerun that code.



The pane ***Connections*** allows you to tab into external databases directly.



The last pane is called ***Tutorial***. Here you can find additional materials to learn ***R*** and Rstudio.



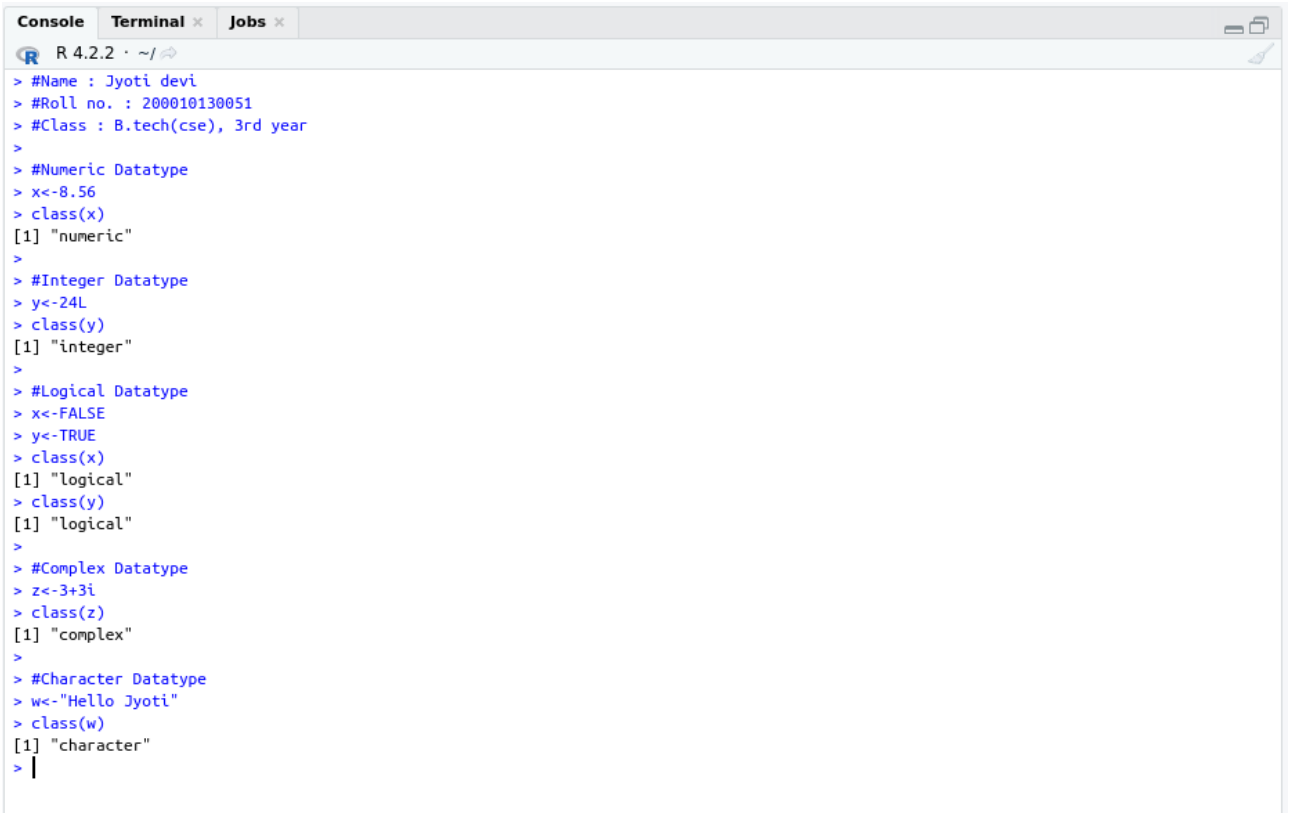
Program-2

P-2 Perform the following operations in R:
a) Create variable of different data type and print their class.
b) Perform type conversion.
c) Perform all the basic mathematical operations.

a).

```
#Name : Jyoti devi
#Roll no. : 200010130051
#Class : B.tech(cse), G-3

#Code:
#Numeric Datatype
x<-8.56
class(x)

#Integer Datatype
y<-24L
class(y)

#Logical Datatype
x<-FALSE
y<-TRUE
class(x)
class(y)

#Complex Datatype
z<-3+3i
class(z)

#Character Datatype
w<-"Hello Jyoti"
class(w)
```

Output:


Console
Terminal
Jobs
R 4.2.2 · ~/
> #Name : Jyoti devi
> #Roll no. : 200010130051
> #Class : B.tech(cse), 3rd year
>
> #Numeric Datatype
> x<-8.56
> class(x)
[1] "numeric"
>
> #Integer Datatype
> y<-24L
> class(y)
[1] "integer"
>
> #Logical Datatype
> x<-FALSE
> y<-TRUE
> class(x)
[1] "logical"
> class(y)
[1] "logical"
>
> #Complex Datatype
> z<-3+3i
> class(z)
[1] "complex"
>
> #Character Datatype
> w<-"Hello Jyoti"
> class(w)
[1] "character"
>

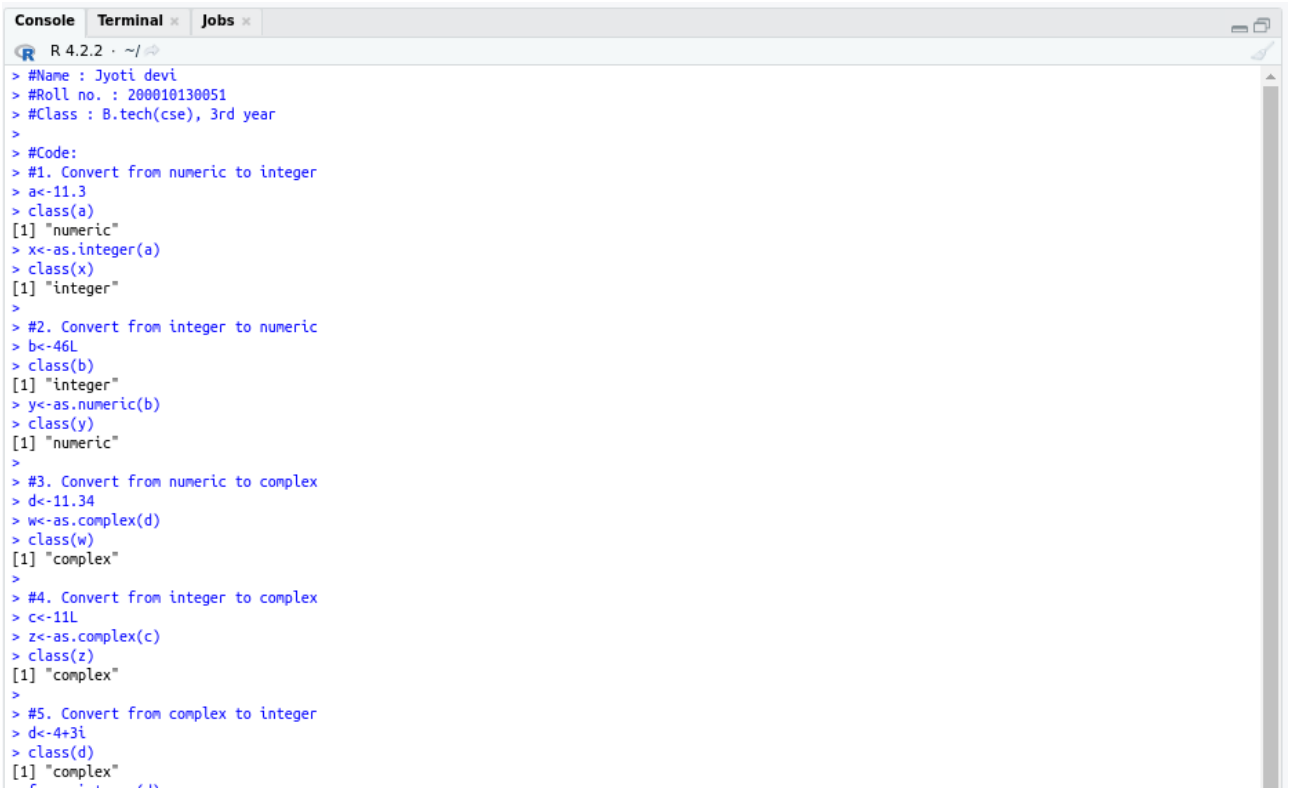
b).

#Name : Jyoti devi
#Roll no. : 200010130051
#Class : B.tech(cse), G-3

#Code:

```
#1. Convert from numeric to integer
a<-11.3
class(a)
x<-as.integer(a)
class(x)

#2. Convert from integer to numeric
b<-46L
class(b)
y<-as.numeric(b)
class(y)

#3. Convert from numeric to complex
d<-11.34
w<-as.complex(d)
class(w)

#4. Convert from integer to complex
 c<-11L
z<-as.complex(c)
class(z)

#5. Convert from complex to integer
d<-4+3i
class(d)
f<-as.integer(d)
class(f)
```

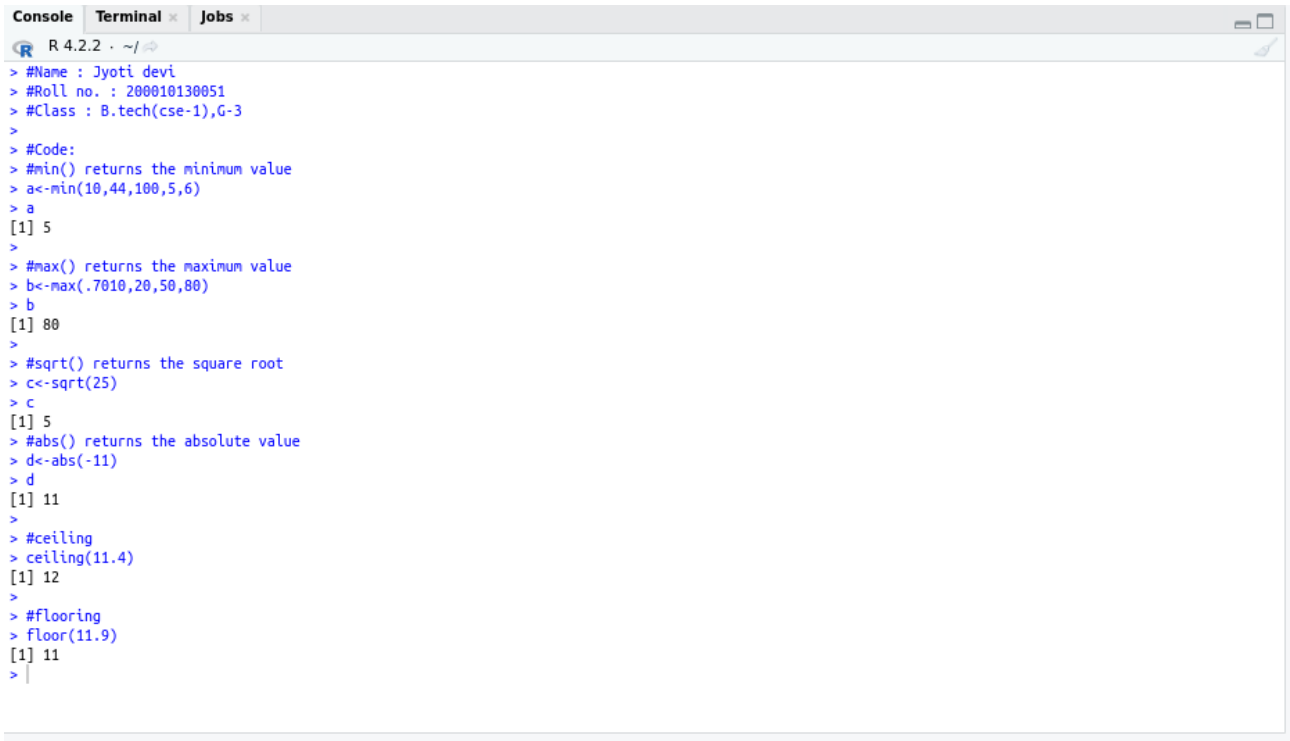
Output:


Console
Terminal
Jobs
R 4.2.2 · ~/
> #Name : Jyoti devi
> #Roll no. : 200010130051
> #Class : B.tech(cse), 3rd year
>
> #Code:
> #1. Convert from numeric to integer
> a<-11.3
> class(a)
[1] "numeric"
> x<-as.integer(a)
> class(x)
[1] "integer"
>
> #2. Convert from integer to numeric
> b<-46L
> class(b)
[1] "integer"
> y<-as.numeric(b)
> class(y)
[1] "numeric"
>
> #3. Convert from numeric to complex
> d<-11.34
> w<-as.complex(d)
> class(w)
[1] "complex"
>
> #4. Convert from integer to complex
> c<-11L
> z<-as.complex(c)
> class(z)
[1] "complex"
>
> #5. Convert from complex to integer
> d<-4+3i
> class(d)
[1] "complex"

c).

```
#Name : Jyoti devi
#Roll no. : 200010130051
#Class : B.tech(cse),G-3

#Code:
#min() returns the minimum value
a<-min(10,44,100,5,6)
a

#max() returns the maximum value
b<-max(.7010,20,50,80)
b

#sqrt() returns the square root
c<-sqrt(25)
c
#abs() returns the absolute value
d<-abs(-11)
d

#ceiling
ceiling(11.4)

#flooring
floor(11.9)
```

Output:


Console
Terminal
Jobs
R 4.2.2 · ~/
> #Name : Jyoti devi
> #Roll no. : 200010130051
> #Class : B.tech(cse-1),G-3
>
> #Code:
> #min() returns the minimum value
> a<-min(10,44,100,5,6)
> a
[1] 5
>
> #max() returns the maximum value
> b<-max(.7010,20,50,80)
> b
[1] 80
>
> #sqrt() returns the square root
> c<-sqrt(25)
> c
[1] 5
> #abs() returns the absolute value
> d<-abs(-11)
> d
[1] 11
>
> #ceiling
> ceiling(11.4)
[1] 12
>
> #flooring
> floor(11.9)
[1] 11
>

Program-3

P-3 Create two vectors and find their addition,substraction and element wise multiplication. Concatenate the two vectors and find their sum and average.

#Name : Jyoti devi
#Roll no. : 200010130051
#Class : B.tech(cse),G-3

#Code:

```
#Creating two Vectors
vec1<-c(1,2,3,4,5)
vec1
vec2<-c(10,20,30,40,50)
vec2

#addition of vectors
vec3<-vec1+vec2
vec3

#subtraction of vectors
sub<-vec1-vec2
sub

#Element wise multiplication
mul<-vec1*vec2
mul

#concatenate two vectors
a<-c("hello","how","are",”you”)
b<-c("I","am","fine")

paste(a,b) #paste function used to combine two vectors
x<-c(1,2,3)
y<-c(4,5,6)
paste(x,y)

#sum and average of vectors
vec5<-c(11,22,33,44,55)
vec6<-c(11,12,13,14,15)
sum(vec5)
sum(vec6)
sum(vec5,vec6)

#average of vectors
mean(vec5)
avg<-sum(vec5)/length(vec5)
vec5
```

Output:


Console
Terminal
Jobs
R 4.2.2 · ~/
> #Name : Jyoti devi
> #Roll no. : 200010130051
> #Class : B.tech(cse), 3rd year
>
> #Code:
> #Creating two Vectors
> vec1<-c(1,2,3,4,5)
> vec1
[1] 1 2 3 4 5
> vec2<-c(10,20,30,40,50)
> vec2
[1] 10 20 30 40 50
>
> #addition of vectors
> vec3<-vec1+vec2
> vec3
[1] 11 22 33 44 55
>
> #subtraction of vectors
> sub<-vec1-vec2
> sub
[1] -9 -18 -27 -36 -45
>
> #Element wise multiplication
> mul<-vec1*vec2
> mul
[1] 10 40 90 160 250
>
> #concatenate two vectors
> a<-c("hello","how","are you")
> b<-c("I","am","fine")
>
> paste(a,b) #paste function used to combine two vectors
[1] "hello I" "how am" "are you fine"
> x<-c(1,2,3)
> y<-c(4,5,6)
> paste(x,y)
[1] "1 4" "2 5" "3 6"
>
>
> #sum and average of vectors
> vec5<-c(11,22,33,44,55)
> vec6<-c(11,12,13,14,15)
> sum(vec5)
[1] 165
> sum(vec6)
[1] 65
> sum(vec5,vec6)
[1] 230
>
> #average of vectors
> mean(vec5)
[1] 33
> avg<-sum(vec5)/length(vec5)
> vec5
[1] 11 22 33 44 55
>