9 9	Mujahid	50	65000	Finance	89
10 10	Asik	27	40000	IT	75
Ex	perience	Cons	stant_Co	olumn Bonus	High_Performer
1	2			1 440.0	TRUE
2	5			1 506.0	TRUE
3	10			1 510.0	TRUE
4	3			1 351.0	FALSE
5	8			1 630.0	TRUE
6	4			1 488.8	TRUE
7	2			1 412.8	TRUE
8	1			1 544.0	FALSE
9	1			1 578.5	TRUE
10	6			1 300.0	FALSE
> dat	a[data\$H	igh_I	Performe	er,]	
ID	Name .	Age S	Salary I	Department P	erformance_Score
1 1	Shihab	25	50000	HR	88
2 2	Kabir	30	55000	Finance	92
3 3	Mahbub	35	60000	IT	85
5 5	Nusrat	28	70000	IT	90
6 6	Mumu		52000	Finance	94
7 7	Meraj			IT	86
	Mujahid		65000	Finance	89
		Const	tant_Col		Migh_Performer
1	2			1 440.0	TRUE
2	5			1 506.0	TRUE
3	10			1 510.0	TRUE
5	8			1 630.0	TRUE
6	4			1 488.8	TRUE
7	2			1 412.8	TRUE
9	1			1 578.5	TRUE
>	0.	_			
	_	riorr	mer <-	!data\$High_F	eriormer
> dat		7)	0 - 1	Description	Danis and Carrie
ID					Performance_Score
1 1 2 2				HR	88 92
2 2 3 3			55000	Finance IT	92 85
3 3				HR	78
-1 4	rralitO	40	-2000	пк	/ 0
5 5	Nuero+	28	70000	T·m	۵۸
5 5 6 6				IT Finance	90
6 6	Mumu	32	52000	Finance	94
	Mumu Meraj	32 45	52000 48000		

```
9 9 Mujahid 50 65000 Finance
10 10 Asik 27 40000 IT
                                           75
  Experience Constant Column Bonus High Performer
                       1 440.0
                                       TRUE
                       1 506.0
                                       TRUE
                                       TRUE
3
         10
                       1 510.0
         3
                       1 351.0
                                      FALSE
4
                                       TRUE
5
         8
                       1 630.0
6
          4
                       1 488.8
                                       TRUE
7
          2
                       1 412.8
                                       TRUE
8
         1
                       1 544.0
                                      FALSE
9
         1
                       1 578.5
                                       TRUE
10
          6
                       1 300.0
                                      FALSE
  Low_Performer
        FALSE
2
        FALSE
3
        FALSE
         TRUE
4
5
        FALSE
6
        FALSE
7
        FALSE
8
         TRUE
9
        FALSE
          TRUE
> # Add a new column with a computed value
> data3 <- data %>%
+ mutate(
    Experience = c(2, 5, 10, 3, 8, 4, 2, 1, 1, 6), # Add a new column with a
existing values
+ Constant Column = 1,
                                               # Add a constant value
+ High Performer = Performance Score >= 85,
                                              # Add a column using conditional
logic
+ Low_Performer = !High_Performer,
                                              # Add a column using conditional
logic
+ Bonus = Salary * Performance Score * 0.0001  # Add a calculated column
> # Removing columns ------
> ## Base R ####
> # Remove a column by assigning NULL
> data3$Constant_Column <- NULL</pre>
```

```
> data3
```

```
ID Name Age Salary Department Performance Score
   1 Shihab 25 50000
                           HR
                                            88
                      Finance
   2 Kabir 30 55000
                                            92
                       IT
  3 Mahbub 35 60000
                                            85
3
  4 Pranto 40 45000
4
                           HR
                                            78
5
  5 Nusrat 28 70000
                           IT
                                            90
  6 Mumu 32 52000
6
                      Finance
                                            94
                       IT
7
  7 Meraj 45 48000
                                            86
8
      Supto 29 68000
                           HR
                                            80
   9 Mujahid 50 65000 Finance
9
                                            89
     Asik 27 40000
                         IT
10 10
                                            75
  Experience Bonus High Performer Low Performer
          2 440.0
                         TRUE
                                     FALSE
         5 506.0
                         TRUE
                                     FALSE
        10 510.0
3
                        TRUE
                                    FALSE
         3 351.0
4
                        FALSE
                                     TRUE
5
         8 630.0
                        TRUE
                                    FALSE
6
         4 488.8
                        TRUE
                                    FALSE
7
          2 412.8
                        TRUE
                                    FALSE
8
          1 544.0
                         FALSE
                                     TRUE
          1 578.5
9
                        TRUE
                                    FALSE
10
          6 300.0
                        FALSE
                                     TRUE
```

> # Remove multiple columns using subset

> data3 <- data3[, !(names(data3) %in% c("High Performer", "Low Performer",</pre> "Experience"))]

> data3

	ID	Name	Age	Salary	Department	Performance_Score
1	1	Shihab	25	50000	HR	88
2	2	Kabir	30	55000	Finance	92
3	3	Mahbub	35	60000	IT	85
4	4	Pranto	40	45000	HR	78
5	5	Nusrat	28	70000	IT	90
6	6	Mumu	32	52000	Finance	94
7	7	Meraj	45	48000	IT	86
8	8	Supto	29	68000	HR	80
9	9	Mujahid	50	65000	Finance	89
10	10	Asik	27	40000	IT	75

Bonus

- 1 440.0
- 2 506.0
- 3 510.0

```
4 351.0
5 630.0
6 488.8
7 412.8
8 544.0
9 578.5
10 300.0
> data
  ID Name Age Salary Department Performance_Score
   1 Shihab 25
                  50000
                                HR
                                                 88
2
   2 Kabir 30
                  55000
                          Finance
                                                 92
   3 Mahbub 35
                 60000
                                                 85
3
                               ΙT
4
   4 Pranto 40 45000
                               HR
                                                 78
5
   5 Nusrat 28 70000
                                ΙT
                                                 90
6
      Mumu 32 52000
                           Finance
                                                 94
7
     Meraj 45 48000
                               ΙT
                                                 86
       Supto 29
                 68000
                                                 80
8
                               HR
    9 Mujahid 50
                 65000
9
                           Finance
                                                 89
        Asik 27 40000
                               ΙT
                                                 75
   Experience Constant_Column Bonus High_Performer
1
           2
                           1 440.0
                                             TRUE
           5
                           1 506.0
2
                                            TRUE
3
          10
                           1 510.0
                                            TRUE
4
           3
                           1 351.0
                                            FALSE
5
           8
                           1 630.0
                                            TRUE
                          1 488.8
           4
6
                                            TRUE
7
           2
                          1 412.8
                                            TRUE
8
           1
                          1 544.0
                                           FALSE
                          1 578.5
           1
                                            TRUE
                          1 300.0
           6
                                           FALSE
10
  Low Performer
1
          FALSE
2
          FALSE
3
          FALSE
           TRUE
4
5
          FALSE
6
          FALSE
7
          FALSE
           TRUE
```

> data

FALSE TRUE

9

10

```
ID     Name Age Salary Department Performance_Score
   1 Shihab 25 50000
1
2
   2 Kabir 30 55000
                                            92
                      Finance
                           IT
   3 Mahbub 35 60000
                                            85
3
4
   4 Pranto 40 45000
                           HR
                                            78
5
   5 Nusrat 28 70000
                           ΙT
                                            90
   6 Mumu 32 52000
                      Finance
6
                                            94
                      IT
7
  7 Meraj 45 48000
                                            86
8
     Supto 29 68000
                           HR
                                            80
   9 Mujahid 50 65000
                      Finance
                                            89
                      IT
10 10 Asik 27 40000
  Experience Constant Column Bonus High Performer
          2
                        1 440.0
                                        TRUE
1
2
          5
                        1 506.0
                                        TRUE
3
         10
                        1 510.0
                                       TRUE
          3
                       1 351.0
                                      FALSE
4
5
                       1 630.0
          8
                                       TRUE
                       1 488.8
6
          4
                                       TRUE
7
          2
                       1 412.8
                                       TRUE
8
          1
                       1 544.0
                                      FALSE
9
          1
                       1 578.5
                                       TRUE
10
          6
                       1 300.0
                                      FALSE
  Low Performer
         FALSE
1
         FALSE
2
         FALSE
3
         TRUE
4
5
        FALSE
6
        FALSE
7
         FALSE
         TRUE
8
9
        FALSE
         TRUE
10
> # Remove a single column
> data <- data %>% select(-Performance Score)
> data
  ID Name Age Salary Department Experience
  1 Shihab 25 50000 HR
2
  2 Kabir 30 55000 Finance
                                      5
3
  3 Mahbub 35 60000
                           ΙT
                                     10
  4 Pranto 40 45000
                                      3
4
                           HR
  5 Nusrat 28 70000
5
                           ΙT
```

```
Mumu 32 52000
                         Finance
7
   7
       Meraj 45 48000
                               ΙT
8
       Supto 29
                  68000
                                HR
    9 Mujahid 50 65000
9
                          Finance
10 10
        Asik 27 40000
                                ΙT
   Constant_Column Bonus High_Performer Low_Performer
1
                1 440.0
                                  TRUE
                                               FALSE
2
                1 506.0
                                  TRUE
                                               FALSE
3
                1 510.0
                                  TRUE
                                               FALSE
4
                1 351.0
                                 FALSE
                                                TRUE
5
                1 630.0
                                  TRUE
                                               FALSE
                1 488.8
                                  TRUE
                                               FALSE
6
7
                1 412.8
                                 TRUE
                                               FALSE
                1 544.0
                                                TRUE
                                 FALSE
9
                1 578.5
                                  TRUE
                                               FALSE
                1 300.0
10
                                 FALSE
                                                TRUE
> # Remove multiple columns
> data <- data %>% select(-c(Department, Age))
> data
   ID
      Name Salary Experience Constant_Column Bonus
   1 Shihab 50000
                                             1 440.0
2
   2 Kabir 55000
                             5
                                             1 506.0
3
   3 Mahbub 60000
                            10
                                             1 510.0
   4 Pranto 45000
                             3
                                             1 351.0
4
5
   5 Nusrat 70000
                                             1 630.0
    6 Mumu 52000
                                             1 488.8
6
      Meraj 48000
7
                             2
                                             1 412.8
8
       Supto 68000
                             1
                                             1 544.0
    9 Mujahid 65000
                             1
                                             1 578.5
        Asik 40000
                                             1 300.0
   High Performer Low Performer
            TRUE
1
                         FALSE
2
            TRUE
                         FALSE
3
            TRUE
                         FALSE
4
           FALSE
                          TRUE
5
            TRUE
                         FALSE
                         FALSE
6
            TRUE
7
            TRUE
                         FALSE
           FALSE
                          TRUE
9
            TRUE
                         FALSE
```

> # Remove columns based on a condition

TRUE

FALSE

10

> data %>% select(-where(is.character))

	ID	Salary	Experience	${\tt Constant_Column}$	Bonus
1	1	50000	2	1	440.0
2	2	55000	5	1	506.0
3	3	60000	10	1	510.0
4	4	45000	3	1	351.0
5	5	70000	8	1	630.0
6	6	52000	4	1	488.8
7	7	48000	2	1	412.8
8	8	68000	1	1	544.0
9	9	65000	1	1	578.5
10	10	40000	6	1	300.0
				_	

High_Performer Low_Performer

	_	_
1	TRUE	FALSE
2	TRUE	FALSE
3	TRUE	FALSE
4	FALSE	TRUE
5	TRUE	FALSE
6	TRUE	FALSE
7	TRUE	FALSE
8	FALSE	TRUE
9	TRUE	FALSE
10	FALSE	TRUE

> data

	ID	Name	Salary	Experience	Constant_Column	Bonus
1	1	Shihab	50000	2	1	440.0
2	2	Kabir	55000	5	1	506.0
3	3	Mahbub	60000	10	1	510.0
4	4	Pranto	45000	3	1	351.0
5	5	Nusrat	70000	8	1	630.0
6	6	Mumu	52000	4	1	488.8
7	7	Meraj	48000	2	1	412.8
8	8	Supto	68000	1	1	544.0
9	9	Mujahid	65000	1	1	578.5
10	10	Asik	40000	6	1	300.0

High_Performer Low_Performer

1	TRUE	FALSE
2	TRUE	FALSE
3	TRUE	FALSE
4	FALSE	TRUE
5	TRUE	FALSE
6	TRUE	FALSE

```
7
           TRUE
                        FALSE
8
           FALSE
                        TRUE
9
           TRUE
                        FALSE
10
           FALSE
                         TRUE
> data <- data.frame(</pre>
  ID = 1:10,
  Name = c("Shihab", "Kabir", "Mahbub", "Pranto", "Nusrat",
           "Mumu", "Meraj", "Supto", "Mujahid", "Asik"),
  Age = c(25, 30, 35, 40, 28, 32, 45, 29, 50, 27),
  Salary = c(50000, 55000, 60000, 45000, 70000,
             52000, 48000, 68000, 65000, 40000),
  Department = c("HR", "Finance", "IT", "HR", "IT",
                 "Finance", "IT", "HR", "Finance", "IT"),
+ Performance_Score = c(88, 92, 85, 78, 90, 94, 86, 80, 89, 75)
+ )
> print(data)
      Name Age Salary Department Performance Score
   1 Shihab 25 50000
1
                               HR
                                                 88
   2 Kabir 30 55000
                                                 92
                         Finance
                             ΙT
3
   3 Mahbub 35 60000
                                                 85
   4 Pranto 40 45000
4
                               HR
                                                 78
5
   5 Nusrat 28 70000
                                                 90
                               ΙT
    6 Mumu 32 52000
6
                         Finance
                                                 94
   7 Meraj 45 48000
                              ΙT
7
                                                 86
8
       Supto 29 68000
                              HR
                                                 80
    9 Mujahid 50 65000
                                                 89
9
                          Finance
10 10
        Asik 27 40000
                              ΙT
                                                 75
> # Rename a column
> colnames(data) [which(colnames(data) == "Salary")] <- "Monthly Salary"</pre>
> data
   ID Name Age Monthly Salary Department
   1 Shihab 25
                         50000
                                       HR
2
   2 Kabir 30
                         55000
                                  Finance
3
   3 Mahbub 35
                         60000
                                       ΙT
4
   4 Pranto 40
                         45000
                                       HR
   5 Nusrat 28
5
                         70000
                                      IT
    6 Mumu 32
                         52000
                                  Finance
6
7
   7 Meraj 45
                         48000
                                      ΙT
       Supto 29
                         68000
8
                                       HR
    9 Mujahid 50
                         65000
9
                                  Finance
                         40000
10 10
      Asik 27
                                      ΙT
   Performance_Score
```

```
1
                 88
2
                  92
3
                 85
                 78
4
5
                 90
6
                  94
7
                  86
8
                  80
9
                  89
10
                 75
> # Modify an existing column
> data$Age <- data$Age + 1</pre>
> data
   ID
        Name Age Monthly_Salary Department
   1 Shihab 26
                          50000
2
    2 Kabir 31
                          55000
                                   Finance
3
   3 Mahbub 36
                          60000
                                        ΙT
   4 Pranto 41
                          45000
4
                                        HR
5
   5 Nusrat 29
                          70000
                                        ΙT
6
   6 Mumu 33
                          52000
                                   Finance
7
   7 Meraj 46
                          48000
                                        ΙT
8
    8
       Supto 30
                          68000
                                        HR
9
    9 Mujahid 51
                           65000
                                   Finance
10 10
      Asik 28
                          40000
                                        ΙT
   Performance_Score
                  88
1
2
                 92
3
                 85
4
                 78
                  90
5
6
                  94
7
                 86
8
                 80
9
                 89
                  75
10
> data
       Name Age Monthly_Salary Department
   ID
1
   1 Shihab 26
                          50000
   2 Kabir 31
                          55000
2
                                   Finance
3
   3 Mahbub 36
                          60000
                                        ΙT
4
   4 Pranto 41
                          45000
                                        HR
```

5 Nusrat 29

ΙT

```
6 6 Mumu 33
                      52000 Finance
7 7 Meraj 46
                      48000
                               IT
  8 Supto 30
                      68000
                                  HR
8
9
   9 Mujahid 51
                      65000 Finance
                       40000 IT
     Asik 28
10 10
  Performance_Score
1
               88
2
               92
3
               85
4
               78
5
               90
6
               94
7
               86
8
               80
9
               89
               75
10
> data[data$Name == "Shihab", "Performance Score"] <- 80</pre>
> data
  ID     Name Age Monthly_Salary Department
  1 Shihab 26
                     50000 HR
2
  2 Kabir 31
                      55000 Finance
3
  3 Mahbub 36
                      60000
                                  IT
4
  4 Pranto 41
                      45000
                                  HR
5
  5 Nusrat 29
                      70000
                                  ΙT
  6 Mumu 33
                      52000
6
                             Finance
                                IT
7
  7 Meraj 46
                      48000
   8 Supto 30
                      68000
                                  HR
8
   9 Mujahid 51
9
                      65000 Finance
                              IT
10 10 Asik 28
                      40000
  Performance_Score
               80
1
2
               92
3
               85
4
               78
5
               90
6
               94
7
               86
8
               80
               75
> data <- data.frame(</pre>
+ ID = 1:10,
```

```
+ Name = c("Shihab", "Kabir", "Mahbub", "Pranto", "Nusrat",
          "Mumu", "Meraj", "Supto", "Mujahid", "Asik"),
+ Age = c(25, 30, 35, 40, 28, 32, 45, 29, 50, 27),
  Salary = c(50000, 55000, 60000, 45000, 70000,
            52000, 48000, 68000, 65000, 40000),
  Department = c("HR", "Finance", "IT", "HR", "IT",
               "Finance", "IT", "HR", "Finance", "IT"),
+ Performance Score = c(88, 92, 85, 78, 90, 94, 86, 80, 89, 75)
+ )
> new row <- data.frame(</pre>
+ ID = 11,
+ Name = "Nadia",
+ Age = 26,
+ Salary = 60000,
+ Department = factor("IT"),
+ Performance Score = 88
+ )
> new row
ID Name Age Salary Department Performance_Score
1 11 Nadia 26 60000 IT
> data <- bind rows(data, new row)</pre>
> data
  ID
      Name Age Salary Department Performance Score
  1 Shihab 25 50000
   2 Kabir 30 55000 Finance
                            ΙT
3
  3 Mahbub 35 60000
                                              85
  4 Pranto 40 45000
                            HR
                                              78
4
5
  5 Nusrat 28 70000
                            ΙT
                                              90
6
  6 Mumu 32 52000 Finance
                           IT
7
  7 Meraj 45 48000
8
   8 Supto 29 68000
                            HR
                                              80
   9 Mujahid 50 65000 Finance
                                              89
                            IT
10 10 Asik 27 40000
                                              75
11 11 Nadia 26 60000
                             IΤ
                                              88
> data <- data %>% filter(Name != "Nadia")
> data %>% filter(Name != "Nadia")
  ID Name Age Salary Department Performance_Score
  1 Shihab 25 50000 HR
  2 Kabir 30 55000 Finance
                                              92
  3 Mahbub 35 60000
3
                            ΙT
                                              85
4 4 Pranto 40 45000
                            HR
                                              78
5
  5 Nusrat 28 70000
                                              90
                            ΙT
```

```
6 6 Mumu 32 52000 Finance
                                            94
                        IT
7 7 Meraj 45 48000
                                            86
  8 Supto 29 68000
                            HR
                                            80
   9 Mujahid 50 65000 Finance
                                            89
                      IT
     Asik 27 40000
                                            75
> data <- data.frame(</pre>
  ID = 1:10,
  Name = c("Shihab", "Kabir", "Mahbub", "Pranto", "Nusrat",
          "Mumu", "Meraj", "Supto", "Mujahid", "Asik"),
+ Age = c(25, 30, 35, 40, 28, 32, 45, 29, 50, 27),
  Salary = c(50000, 55000, 60000, 45000, 70000,
           52000, 48000, 68000, 65000, 40000),
+ Department = c("HR", "Finance", "IT", "HR", "IT",
               "Finance", "IT", "HR", "Finance", "IT"),
+ Performance Score = c(88, 92, 85, 78, 90, 94, 86, 80, 89, 75)
> # Update values in specific rows
> data %>% mutate(
+ Performance_Score = if_else(Name == "Shihab", 80, if_else(
    Department == "HR", 60, Performance Score
+ ))
+ )
     Name Age Salary Department Performance Score
  1 Shihab 25 50000
   2 Kabir 30 55000 Finance
                                             92
                           ΙT
3
  3 Mahbub 35 60000
                                             85
  4 Pranto 40 45000
                            HR
4
                                             60
5
  5 Nusrat 28 70000
                             ΙT
                                             90
6
  6 Mumu 32 52000 Finance
  7 Meraj 45 48000
                           ΙT
8
  8 Supto 29 68000
                            HR
                                            60
   9 Mujahid 50 65000 Finance
                                            89
10 10 Asik 27 40000
                      IT
                                            75
> data %>% mutate(
  Performance Score = if else(Name == "Shihab", 80, if else(
    Department == "HR", 60, Performance Score
+ ))
+ )
     Name Age Salary Department Performance Score
1 1 Shihab 25 50000 HR
2 2 Kabir 30 55000 Finance
                                             92
3 3 Mahbub 35 60000 IT
                                             85
```

4	4	Pranto	40	45000	HR	60
5	5	Nusrat	28	70000	IT	90
6	6	Mumu	32	52000	Finance	94
7	7	Meraj	45	48000	IT	86
8	8	Supto	29	68000	HR	60
9	9	Mujahid	50	65000	Finance	89
10	10	Asik	27	40000	IT	75
> data %>%						

+ arrange(Performance_Score)

	ID	Name	Age	Salary	Department	Performance_Score
1	10	Asik	27	40000	IT	75
2	4	Pranto	40	45000	HR	78
3	8	Supto	29	68000	HR	80
4	3	Mahbub	35	60000	IT	85
5	7	Meraj	45	48000	IT	86
6	1	Shihab	25	50000	HR	88
7	9	Mujahid	50	65000	Finance	89
8	5	Nusrat	28	70000	IT	90
9	2	Kabir	30	55000	Finance	92
10	6	Mumu	32	52000	Finance	94

> data %>%

+ arrange(desc(Performance_Score))

	ID	Name	Age	Salary	Department	Performance_Score
1	6	Mumu	32	52000	Finance	94
2	2	Kabir	30	55000	Finance	92
3	5	Nusrat	28	70000	IT	90
4	9	Mujahid	50	65000	Finance	89
5	1	Shihab	25	50000	HR	88
6	7	Meraj	45	48000	IT	86
7	3	Mahbub	35	60000	IT	85
8	8	Supto	29	68000	HR	80
9	4	Pranto	40	45000	HR	78
10	10	Asik	27	40000	IT	75

> data %>%

+ arrange(Department, desc(Performance_Score))

	ID	Name	Age	Salary	Department	Performance_Score
1	6	Mumu	32	52000	Finance	94
2	2	Kabir	30	55000	Finance	92
3	9	Mujahid	50	65000	Finance	89
4	1	Shihab	25	50000	HR	88
5	8	Supto	29	68000	HR	80
6	4	Pranto	40	45000	HR	78

```
5 Nusrat 28 70000
                               ΙT
                                                 90
  7 Meraj 45 48000
                               ΙT
                                                 86
  3 Mahbub 35 60000
                                                 85
9
                               ΙT
10 10 Asik 27 40000
                                                 75
                               ΤТ
> data wide <- data.frame(</pre>
+ country = c("BD", "Ghana", "UK", "Canada"),
+ continent = c("Asia", "Africa", "Europe", "North America"),
+ GDP 1960 = c(10, 20, 30, 40),
+ GDP 1970 = c(13, 23, 33, 45),
+ GDP 2010 = c(15, 25, 35, 60),
+ stringsAsFactors = FALSE
+ )
> data wide
           continent GDP_1960 GDP_1970 GDP_2010
  country
1 BD
                 Asia
                          10
                                     13
              Africa
                            20
  Ghana
                                     23
                                              25
3
      UK
              Europe
                           30
                                     33
                                              35
4 Canada North America
                           40
                                     45
                                              60
> data long <- data wide %>%
+ tidyr::pivot longer(cols = starts with("GDP "),  # Selecting columns starting with
"GDP "
                     names to = "Year",
                                                 # The name of the new column that
will hold the years
                      names_prefix = "GDP ",
                                                  # Remove "GDP " from the column
names
                      values to = "GDP"
                                                  # The name of the new column that
will hold the GDP values
+ )
Error in loadNamespace(x) : there is no package called 'tidyr'
> install.packages("tidyr")
also installing the dependencies 'purrr', 'cpp11'
trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.4/purrr 1.0.2.zip'
Content type 'application/zip' length 513726 bytes (501 KB)
downloaded 501 KB
trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.4/cpp11_0.5.1.zip'
Content type 'application/zip' length 310612 bytes (303 KB)
downloaded 303 KB
trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.4/tidyr 1.3.1.zip'
Content type 'application/zip' length 1272747 bytes (1.2 MB)
```

downloaded 1.2 MB

```
package 'purrr' successfully unpacked and MD5 sums checked
package 'cpp11' successfully unpacked and MD5 sums checked
package 'tidyr' successfully unpacked and MD5 sums checked
The downloaded binary packages are in
     C:\Users\ACER\AppData\Local\Temp\RtmpQB1kS5\downloaded packages
> data long
Error: object 'data long' not found
> data long <- data wide %>%
+ tidyr::pivot longer(cols = starts with("GDP "),  # Selecting columns starting with
"GDP "
                    names_to = "Year",
                                               # The name of the new column that
will hold the years
                    names prefix = "GDP ",
                                               # Remove "GDP " from the column
names
                    values to = "GDP"
                                               # The name of the new column that
will hold the GDP values
> data long
# A tibble: 12 × 4
  country continent
                     Year GDP
  <chr> <chr>
                     <chr> <dbl>
1 BD
                     1960
        Asia
        Asia
                     1970
2 BD
                             13
                     2010
3 BD
        Asia
                             15
4 Ghana Africa
                     1960
                             20
5 Ghana Africa
                     1970
                             23
6 Ghana Africa
                     2010
                             25
7 UK
                             30
       Europe
                     1960
8 UK
                     1970
        Europe
                             33
9 UK
        Europe
                     2010
                             35
10 Canada North America 1960
                             40
11 Canada North America 1970
12 Canada North America 2010
> data_wide_back <- data_long %>%
+ pivot wider(names from = "Year",  # Columns created based on unique values in the
"Year" column
            values from = "GDP"  # Values for each "Year" will come from the
"GDP" column
+ )
```

```
Error in pivot_wider(., names_from = "Year", values_from = "GDP") :
 could not find function "pivot wider"
> data wide back <- data long %>%
+ pivot wider(names from = "Year",  # Columns created based on unique values in the
"Year" column
             values from = "GDP"  # Values for each "Year" will come from the
"GDP" column
+ )
Error in pivot wider(., names from = "Year", values from = "GDP") :
 could not find function "pivot wider"
> data wide back <- data long %>%
+ pivot wider(names from = "Year",  # Columns created based on unique values in the
"Year" column
              values from = "GDP"  # Values for each "Year" will come from the
"GDP" column
+ )
Error in pivot wider(., names from = "Year", values from = "GDP") :
 could not find function "pivot wider"
> data_wide_back <- data_long %>%
+ filter(Year != "1960") %>%
+ pivot wider(names from = "Year",  # Columns created based on unique values in the
"Year" column
              values from = "GDP",  # Values for each "Year" will come from the
"GDP" column
             names prefix = "GDP "
Error in pivot wider(., names from = "Year", values from = "GDP", names prefix =
"GDP ") :
 could not find function "pivot wider"
> # install.packages("tidyr")
> library(tidyr)
> data wide back <- data long %>%
+ pivot wider(names from = "Year",  # Columns created based on unique values in the
"Year" column
             values from = "GDP" # Values for each "Year" will come from the
"GDP" column
+ )
> data wide back
\# A tibble: 4 \times 5
country continent `1960` `1970` `2010`
 <chr> <chr>
                       <dbl> <dbl> <dbl>
1 BD Asia
                         10 13 15
```

```
2 Ghana Africa 20 23 25
3 UK Europe 30 33 35
3 UK Europe
4 Canada North America 40 45
                                    60
> data wide back <- data long %>%
+ filter(Year != "1960") %>%
+ pivot_wider(names_from = "Year",  # Columns created based on unique values in the
"Year" column
             values from = "GDP",  # Values for each "Year" will come from the
"GDP" column
            names prefix = "GDP "
+ )
> data wide back
\# A tibble: 4 \times 4
country continent GDP_1970 GDP_2010
 <chr> <chr> <chr> <dbl> <dbl>
1 BD Asia
                         13
                                15
2 Ghana Africa
                         23
                                  25
3 UK Europe
                         33
                                 35
4 Canada North America 45 60
> # Sample dataset 1
> employees <- data.frame(</pre>
+ ID = c(1, 2, 3, 4, 5),
+ Name = c("Shihab", "Kabir", "Mahbub", "Pranto", "Nusrat"),
+ Department = c("HR", "IT", "Finance", "IT", "HR")
+ )
> employees
ID Name Department
1 1 Shihab
                HR
2 2 Kabir
3 3 Mahbub Finance
            IT
4 4 Pranto
5 5 Nusrat
                 HR
> # Sample dataset 2
> salaries <- data.frame(</pre>
+ ID = c(1, 2, 3, 4, 6),
+ Salary = c(50000, 60000, 70000, 75000, 40000)
+ )
> employees
 ID Name Department
1 1 Shihab
2 2 Kabir
                ΙT
3 3 Mahbub Finance
```

```
4 4 Pranto
                IT
5 5 Nusrat
                  HR
> salaries
 ID Salary
1 1 50000
2 2 60000
3 3 70000
4 4 75000
5 6 40000
> left_join(employees, salaries, by = "ID")
      Name Department Salary
1 1 Shihab
                 HR 50000
2 2 Kabir
                IT 60000
3 3 Mahbub
           Finance 70000
4 4 Pranto
                IT 75000
                 HR NA
5 5 Nusrat
> inner_join(employees, salaries, by = "ID")
     Name Department Salary
1 1 Shihab
                 HR 50000
2 2 Kabir
                IT 60000
3 3 Mahbub Finance 70000
4 4 Pranto
                 IT 75000
> right join(employees, salaries, by = "ID")
      Name Department Salary
1 1 Shihab
                HR 50000
2 2 Kabir
                IT 60000
3 3 Mahbub Finance 70000
                IT 75000
4 4 Pranto
                <NA> 40000
5 6 <NA>
> full join(employees, salaries, by = "ID")
      Name Department Salary
1 1 Shihab
                 HR 50000
2 2 Kabir
                IT 60000
 3 Mahbub
             Finance 70000
  4 Pranto
                IT 75000
5 5 Nusrat
                 HR NA
6 6 <NA>
                <NA> 40000
> source("D:/RProgramming/Class6/Self/Class6(inClass).R")
        Name Age Salary Department Performance_Score
  1 Shihab 25 50000
                              HR
                                              88
2
   2 Kabir 30 55000
                       Finance
                                              92
3
  3 Mahbub 35 60000
                             ΙT
                                              85
```

4	4	Pranto	40	45000	HR	78
5	5	Nusrat	28	70000	IT	90
6	6	Mumu	32	52000	Finance	94
7	7	Meraj	45	48000	IT	86
8	8	Supto	29	68000	HR	80
9	9	Mujahid	50	65000	Finance	89
10	10	Asik	27	40000	IT	75