20250518_01

May 18, 2025

```
[1]: library(tidyverse)
```

```
Attaching core tidyverse packages                        tidyverse
2.0.0
  dplyr     1.1.4      readr     2.1.5
  forcats   1.0.0      stringr   1.5.1
  ggplot2   3.5.2      tibble    3.2.1
  lubridate 1.9.4      tidyr     1.3.1
  purrr     1.0.4
  Conflicts
tidyverse_conflicts()
  dplyr::filter() masks stats::filter()
  dplyr::lag()    masks stats::lag()
  Use the conflicted package
(<http://conflicted.r-lib.org/>) to force all conflicts to
become errors
```

```
[3]: set.seed(2025)

students = tibble(Student_ID = 1:30,
                  Math = sample(30:90, 30, replace = TRUE),
                  English = sample(50:100, 30, replace = TRUE),
                  Science = sample(45:95, 30, replace = TRUE))
```

```
[5]: students = students %>% mutate(Avg_Score = (Math + English + Science)/3,
                               Grade = ifelse(Avg_Score >= 80, 'A',
                                       ifelse(Avg_Score >= 70, 'B',
                                       ifelse(Avg_Score >= 60, 'C', 'F'))),
                               Passed = ifelse(Avg_Score >= 60, 'Passed',␣
      ↪'Failed'),
                               Flag = ifelse(Math < 60 | English < 60 | Science␣
      ↪< 60, 'Need Help', 'Good'))
```

```
[13]: students
```

A tibble: 30 × 8

Student_ID <int>	Math <int>	English <int>	Science <int>	Avg_Score <dbl>	Grade <chr>	Passed <chr>	Flag <chr>
1	42	95	62	66.33333	C	Passed	Need Help
2	41	93	61	65.00000	C	Passed	Need Help
3	65	100	61	75.33333	B	Passed	Good
4	55	99	84	79.33333	B	Passed	Need Help
5	30	65	69	54.66667	F	Failed	Need Help
6	52	52	82	62.00000	C	Passed	Need Help
7	88	54	94	78.66667	B	Passed	Need Help
8	39	65	92	65.33333	C	Passed	Need Help
9	42	99	48	63.00000	C	Passed	Need Help
10	78	98	68	81.33333	A	Passed	Good
11	41	52	93	62.00000	C	Passed	Need Help
12	33	64	49	48.66667	F	Failed	Need Help
13	56	99	78	77.66667	B	Passed	Need Help
14	52	99	73	74.66667	B	Passed	Need Help
15	88	92	91	90.33333	A	Passed	Good
16	82	92	49	74.33333	B	Passed	Need Help
17	52	98	60	70.00000	B	Passed	Need Help
18	88	95	87	90.00000	A	Passed	Good
19	40	53	85	59.33333	F	Failed	Need Help
20	60	73	68	67.00000	C	Passed	Good
21	43	69	67	59.66667	F	Failed	Need Help
22	66	75	84	75.00000	B	Passed	Good
23	61	62	59	60.66667	C	Passed	Need Help
24	58	60	56	58.00000	F	Failed	Need Help
25	62	100	82	81.33333	A	Passed	Good
26	89	90	65	81.33333	A	Passed	Good
27	54	76	47	59.00000	F	Failed	Need Help
28	83	65	88	78.66667	B	Passed	Good
29	53	71	52	58.66667	F	Failed	Need Help
30	32	97	52	60.33333	C	Passed	Need Help

```
[7]: students_long = students %>% pivot_longer(cols = c(Math, English, Science),
                                               names_to = "Subject",
                                               values_to = "Score")
```

```
[11]: students_long
```

Student_ID <int>	Avg_Score <dbl>	Grade <chr>	Passed <chr>	Flag <chr>	Subject <chr>	Score <int>
1	66.33333	C	Passed	Need Help	Math	42
1	66.33333	C	Passed	Need Help	English	95
1	66.33333	C	Passed	Need Help	Science	62
2	65.00000	C	Passed	Need Help	Math	41
2	65.00000	C	Passed	Need Help	English	93
2	65.00000	C	Passed	Need Help	Science	61
3	75.33333	B	Passed	Good	Math	65
3	75.33333	B	Passed	Good	English	100
3	75.33333	B	Passed	Good	Science	61
4	79.33333	B	Passed	Need Help	Math	55
4	79.33333	B	Passed	Need Help	English	99
4	79.33333	B	Passed	Need Help	Science	84
5	54.66667	F	Failed	Need Help	Math	30
5	54.66667	F	Failed	Need Help	English	65
5	54.66667	F	Failed	Need Help	Science	69
6	62.00000	C	Passed	Need Help	Math	52
6	62.00000	C	Passed	Need Help	English	52
6	62.00000	C	Passed	Need Help	Science	82
7	78.66667	B	Passed	Need Help	Math	88
7	78.66667	B	Passed	Need Help	English	54
7	78.66667	B	Passed	Need Help	Science	94
8	65.33333	C	Passed	Need Help	Math	39
8	65.33333	C	Passed	Need Help	English	65
8	65.33333	C	Passed	Need Help	Science	92
9	63.00000	C	Passed	Need Help	Math	42
9	63.00000	C	Passed	Need Help	English	99
9	63.00000	C	Passed	Need Help	Science	48
10	81.33333	A	Passed	Good	Math	78
10	81.33333	A	Passed	Good	English	98
10	81.33333	A	Passed	Good	Science	68
21	59.66667	F	Failed	Need Help	Math	43
21	59.66667	F	Failed	Need Help	English	69
21	59.66667	F	Failed	Need Help	Science	67
22	75.00000	B	Passed	Good	Math	66
22	75.00000	B	Passed	Good	English	75
22	75.00000	B	Passed	Good	Science	84
23	60.66667	C	Passed	Need Help	Math	61
23	60.66667	C	Passed	Need Help	English	62
23	60.66667	C	Passed	Need Help	Science	59
24	58.00000	F	Failed	Need Help	Math	58
24	58.00000	F	Failed	Need Help	English	60
24	58.00000	F	Failed	Need Help	Science	56
25	81.33333	A	Passed	Good	Math	62
25	81.33333	A	Passed	Good	English	100
25	81.33333	A	Passed	Good	Science	82
26	81.33333	A	Passed	Good	Math	89
26	81.33333	A_3	Passed	Good	English	90
26	81.33333	A	Passed	Good	Science	65
27	59.00000	F	Failed	Need Help	Math	54
27	59.00000	F	Failed	Need Help	English	76

A tibble: 90 × 7

```
[15]: students_long %>%
      group_by(Subject, Grade) %>%
      summarise(Avg_Score = mean(Score),
                Count = n(),
                .groups = "drop")
```

A tibble: 12 × 4

Subject <chr>	Grade <chr>	Avg_Score <dbl>	Count <int>
English	A	95.00000	5
English	B	86.77778	9
English	C	76.44444	9
English	F	65.42857	7
Math	A	81.00000	5
Math	B	66.55556	9
Math	C	45.55556	9
Math	F	44.42857	7
Science	A	78.60000	5
Science	B	74.55556	9
Science	C	68.55556	9
Science	F	60.71429	7

```
[17]: students_wide = students_long %>% pivot_wider(names_from = Subject,
                                                    values_from = Score)
```

```
[19]: students_wide
```

A tibble: 30 × 8

Student_ID <int>	Avg_Score <dbl>	Grade <chr>	Passed <chr>	Flag <chr>	Math <int>	English <int>	Science <int>
1	66.33333	C	Passed	Need Help	42	95	62
2	65.00000	C	Passed	Need Help	41	93	61
3	75.33333	B	Passed	Good	65	100	61
4	79.33333	B	Passed	Need Help	55	99	84
5	54.66667	F	Failed	Need Help	30	65	69
6	62.00000	C	Passed	Need Help	52	52	82
7	78.66667	B	Passed	Need Help	88	54	94
8	65.33333	C	Passed	Need Help	39	65	92
9	63.00000	C	Passed	Need Help	42	99	48
10	81.33333	A	Passed	Good	78	98	68
11	62.00000	C	Passed	Need Help	41	52	93
12	48.66667	F	Failed	Need Help	33	64	49
13	77.66667	B	Passed	Need Help	56	99	78
14	74.66667	B	Passed	Need Help	52	99	73
15	90.33333	A	Passed	Good	88	92	91
16	74.33333	B	Passed	Need Help	82	92	49
17	70.00000	B	Passed	Need Help	52	98	60
18	90.00000	A	Passed	Good	88	95	87
19	59.33333	F	Failed	Need Help	40	53	85
20	67.00000	C	Passed	Good	60	73	68
21	59.66667	F	Failed	Need Help	43	69	67
22	75.00000	B	Passed	Good	66	75	84
23	60.66667	C	Passed	Need Help	61	62	59
24	58.00000	F	Failed	Need Help	58	60	56
25	81.33333	A	Passed	Good	62	100	82
26	81.33333	A	Passed	Good	89	90	65
27	59.00000	F	Failed	Need Help	54	76	47
28	78.66667	B	Passed	Good	83	65	88
29	58.66667	F	Failed	Need Help	53	71	52
30	60.33333	C	Passed	Need Help	32	97	52

```
[21]: students_wide %>% select(Student_ID, Math, English, Science, everything())
```

A tibble: 30 × 8

Student_ID	Math	English	Science	Avg_Score	Grade	Passed	Flag
<int>	<int>	<int>	<int>	<dbl>	<chr>	<chr>	<chr>
1	42	95	62	66.33333	C	Passed	Need Help
2	41	93	61	65.00000	C	Passed	Need Help
3	65	100	61	75.33333	B	Passed	Good
4	55	99	84	79.33333	B	Passed	Need Help
5	30	65	69	54.66667	F	Failed	Need Help
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8	39	65	92	65.33333	C	Passed	Need Help
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20	60	73	68	67.00000	C	Passed	Good
21	43	69	67	59.66667	F	Failed	Need Help
22	66	75	84	75.00000	B	Passed	Good
23	61	62	59	60.66667	C	Passed	Need Help
24	58	60	56	58.00000	F	Failed	Need Help
25	62	100	82	81.33333	A	Passed	Good
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28	83	65	88	78.66667	B	Passed	Good
29	53	71	52	58.66667	F	Failed	Need Help
30	32	97	52	60.33333	C	Passed	Need Help