How about more categories?

- There are a few ways of modeling predictors with many categories:

  - **Contrasts**: Each category is compared to a **baseline**, and the coefficients are comparisons between baseline and levels

  - **One-hot**: coefficients are means of each level of the predictor

  - **Residuals**: an overall mean is measured, and coefficients are differences between each level and the global mean

```
> x = sample(LETTERS[1:3], 9, replace = TRUE)
> y = 1 + ifelse(x == "A", 0,
         ifelse(x == "B", 1, 2)) + rnorm(9)
> df = tibble(y, x)
> df
# A tibble: 9 × 2
        y x
    <dbl> <chr>
1  1.25     B
2  0.870    A
3 -0.00180  A
4  1.18     B
5  2.03     C
6  2.60     B
7  2.55     B
8  3.92     C
9  4.66     B
```

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Contrasts, the default in most lm() functions

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```
> fit_contrasts = stan_glm(y ~ x, data = df)
> summary(fit_contrasts)[1:3, 1:3]
            mean mcse    sd
(Intercept) 0.72    0 0.13
xB          1.32    0 0.20
xC          2.20    0 0.186
```

Q: How do we get estimates for the mean in each class?