# PROBLEM 1

```python
# Matches Won by Creamline based on Practice
P_practice = 0.7
P_no_practice = 0.3
P_win_given_practice = 0.85
P_win_given_no_practice = 0.3

# Total probability of a win
P_win = (
    P_win_given_practice * P_practice +
    P_win_given_no_practice * P_no_practice
)

# Applying Bayes' Theorem: P(Practice | Win)
P_practice_given_win = (
    P_win_given_practice * P_practice
) / P_win

print(f"Probability Creamline won given they practiced:
{P_win_given_practice:.2f}")

print(f"Probability Creamline practiced given they won:
{P_practice_given_win:.4f}")
```

# PROBLEM 2

```python
# Customer Feedback to Coffee Crumble
def bayes_theorem(p_liked, p_positive_given_liked,
p_positive_given_not_liked):
    p_not_liked = 1 - p_liked
    p_positive = (p_positive_given_liked * p_liked) +
(p_positive_given_not_liked * p_not_liked)
    p_liked_given_positive = (p_positive_given_liked * p_liked) /
p_positive
    return p_liked_given_positive

# Probabilities specific to Coffee Crumble
p_liked = 0.6
p_positive_given_liked = 0.9
p_positive_given_not_liked = 0.25

# Applying Bayes' Theorem
p_liked_given_positive = bayes_theorem(p_liked,
p_positive_given_liked, p_positive_given_not_liked)

# Result
print("=== Coffee Crumble Customer Feedback ===")
print(f"P(Liked | Positive Feedback) = {p_liked_given_positive:.4f}")
```

# PROBLEM 3

```python
# Probability of passing the UPCAT

# Prior
P_review = 0.4
P_no_review = 0.6

# Likelihood
P_pass_given_review = 0.65
P_pass_given_no_review = 0.2

# Total probability of passing the UPCAT
P_pass = (
    P_pass_given_review * P_review +
    P_pass_given_no_review * P_no_review
)

# Bayes' Theorem: P(Review | Pass)
P_review_given_pass = (
    P_pass_given_review * P_review
) / P_pass


print(f"Probability a student passed UPCAT given they attended a
review center: {P_pass_given_review:.2f}")

print(f"Probability a student attended a review center given they
passed UPCAT: {P_review_given_pass:.4f}")
```