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% Number of balls of each color type
balls_type1 = 20;
balls_type2 = 30;
balls_type3 = 40;
balls_type4 = 10;

% Total number of balls in the urn
total_balls = balls_type1 + balls_type2 + balls_type3 + balls_type4;

% Create an array representing all balls in the urn with corresponding
color types
urn = [ones(1, balls_type1) * 1, ...    % Color type 1
       ones(1, balls_type2) * 2, ...    % Color type 2
       ones(1, balls_type3) * 3, ...    % Color type 3
       ones(1, balls_type4) * 4];       % Color type 4

% Number of balls to be drawn
num_drawn = 10;

% Perform the random sampling without replacement using randperm
perm = randperm(total_balls, num_drawn); % Randomly permute indices and
select the first 10
drawn_balls = urn(perm); % Get the actual balls corresponding to the
selected indices

% Count the number of each color type in the drawn balls
X1 = sum(drawn_balls == 1); % Number of color type 1 balls drawn
X2 = sum(drawn_balls == 2); % Number of color type 2 balls drawn
X3 = sum(drawn_balls == 3); % Number of color type 3 balls drawn
X4 = sum(drawn_balls == 4); % Number of color type 4 balls drawn

% Display the results
fprintf('Number of balls of color type 1: %d\n', X1);

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Number of balls of color type 1: 2

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fprintf('Number of balls of color type 2: %d\n', X2);
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Number of balls of color type 2: 4

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fprintf('Number of balls of color type 3: %d\n', X3);
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Number of balls of color type 3: 4

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fprintf('Number of balls of color type 4: %d\n', X4);
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Number of balls of color type 4: 0