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**ROLL NO:24**

**BATCH : B2**

**COURSE: DATA SCIENCE PRACTICAL**

**Assginment No. 4**

**Problem Statement :**

**Write a Python script to find Binomial distribution**

**Code :**

**import math**

**# Function to manually calculate factorial**

**def factorial(n):**

**if n == 0 or n == 1:**

**return 1**

**else:**

**result = 1**

**for i in range(2, n + 1):**

**result \*= i**

**return result**

**# Function to manually calculate binomial coefficient (n choose k)**

**def binomial\_coefficient(n, k):**

**return factorial(n) // (factorial(k) \* factorial(n - k))**

**# Function to manually calculate binomial distribution probability**

**def binomial\_distribution\_manual(n, p, k):**

**# Step 1: Calculate binomial coefficient**

**binom\_coeff = binomial\_coefficient(n, k)**

**# Step 2: Calculate p^k and (1-p)^(n-k)**

**p\_to\_the\_power\_k = p \*\* k**

**q\_to\_the\_power\_n\_minus\_k = (1 - p) \*\* (n - k)**

**# Step 3: Calculate probability**

**probability = binom\_coeff \* p\_to\_the\_power\_k \* q\_to\_the\_power\_n\_minus\_k**

**# Show all the steps for manual calculation**

**print(f"Factorial of n ({n}): {factorial(n)}")**

**print(f"Factorial of k ({k}): {factorial(k)}")**

**print(f"Factorial of (n-k) ({n-k}): {factorial(n - k)}")**

**print(f"Binomial Coefficient (n choose k): {binom\_coeff}")**

**print(f"p^k = {p}^{k} = {p\_to\_the\_power\_k}")**

**print(f"(1-p)^(n-k) = (1-{p})^{n-k} = {q\_to\_the\_power\_n\_minus\_k}")**

**print(f"Binomial Probability: {probability}")**

**return probability**

**# Real-time example: Coin flips**

**n = 10 # Number of coin flips**

**p = 0.5 # Probability of getting heads**

**k = 6 # Number of heads we are interested in**

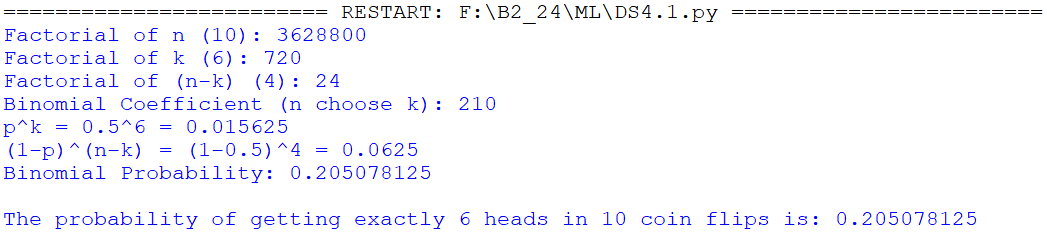
**# Calculate binomial probability manually**

**binom\_prob = binomial\_distribution\_manual(n, p, k)**

**# Output the result**

**print(f"\nThe probability of getting exactly {k} heads in {n} coin flips is: {binom\_prob}")**

**OUTPUT:**

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