

# Unit 3 - Week 1

## Course outline

### How does an NPTEL online course work?

#### Week 0

#### Week 1

- Motivation for Counting
- Paper Folding Example
- Rubik's Cube Example
- Factorial Example
- Counting in Computer Science
- Motivation for Catalan numbers
- Rule of Sum and Rule of Product
- Problems on Rule of Sum and Rule of Product
- Factorial Explained
- Proof of n! - Part 1
- Proof of n! - Part 2
- Astronomical Numbers
- Permutations - Part 1
- Permutations - Part 2
- Permutations - Part 3
- Permutations - Part 4
- Problems on Permutations
- Combinations - Part 1
- Combinations - Part 2
- Combinations - Part 3
- Combinations - Part 4
- Problems on Combinations
- Difference between Permutations and Combinations
- Combinations with Repetition - Part 1
- Combinations with Repetition - Part 2
- Combination with Repetition - Problems
- Binomial Theorem
- Applications of Binomial Theorem
- Properties of Binomial Theorem
- Multinomial Theorem
- Problems on Binomial and Multinomial Theorem
- Pascal's Triangle
- Fun facts on Pascal's Triangle

#### Catalan Numbers - Part 1

#### Catalan numbers - Part 2

#### Catalan Numbers - Part 3

#### Catalan Numbers - Part 4

#### Examples of Catalan Numbers

#### Chapter Summary

#### Quiz : Assignment 1

#### Week 1 Feedback

#### Week 2

#### Week 3

#### Week 4

#### Week 5

#### Week 6

#### Week 7

#### Week 8

#### Week 9

#### Week 10

#### Week 11

#### Week 12

#### Text Transcripts

#### Download Videos

# Assignment 1

The due date for submitting this assignment has passed.  
As per our records you have not submitted this assignment.

**Due on 2020-02-12, 23:59 IST.**

- 1) How many permutations are possible with 8 letters 'a', 'b', 'c', 'g', 'h', 'p', 'q' and 'm' such that 3rd and 7th letter of the permutation is always 'm' and 'h' respectively? 1 point
- $\frac{8!}{2!}$   
  $\frac{8!}{2!2!}$   
  $6!$   
  $\binom{8}{2}$
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
 $6!$
- 2) The number of paths from (1, 0) to (7, 6) without crossing the diagonal (diagonal here means the line joining (1, 0) and (7, 6)) is: 1 point
- 1430  
 42  
 429  
 132
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
 $132$
- 3) If  $2 \times^n P_2 + 50 = {}^{2n} P_2$ , where n is a positive integer. Then the value of n is 1 point
- 7  
 6  
 5  
 4
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
 $5$
- 4) In how many ways can we distribute 12 chocolates into 3 distinct boxes? 1 point
- $\binom{12}{3}$   
  $\binom{14}{2}$   
  $\binom{14}{3}$   
  $\binom{11}{2}$
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
 $\binom{14}{2}$
- 5) In how many ways can letters of 'MATHEMATICS' be arranged? 1 point
- $11!$   
  $\frac{11!}{2!2!2!}$   
  $\frac{11!}{2!2!}$   
  $\frac{11!}{3}$
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
 $\frac{11!}{2!2!2!}$
- 6) The coefficient of  $a^5b^2$  in the expansion of  $(2a - 3b)^7$  is equal to 1 point
- 3024  
 -6048  
 -3024  
 6048
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
 $6048$
- 7) If a library has 45 books on Physics and 60 books on Mathematics, then in how many ways can a student read a book either of Physics or of Mathematics? 1 point
- 105  
 15  
 2700  
 60
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
 $105$
- 8) How many positive integers n can we form using all the digits 2, 3, 3, 6, 6, 7, 9 if we want n to exceed 6, 000, 000? 1 point
- $6!$   
  $\frac{6!}{2!}$   
  $\frac{6!}{2!2!}$   
  $\frac{7}{2!2!}$
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
 $6!$
- 9) In how many ways can we draw 3 different cards from a deck of 52 cards, where the order in which cards are drawn doesn't matter? 1 point
- $52 \times 51 \times 50$   
  $\binom{52}{3}$   
  $\frac{1}{6} \binom{52}{3}$   
 None of the above
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
 $\binom{52}{3}$
- 10) The number of non-negative integer solutions of  $x_1 + x_2 + x_3 + x_4 = 32$  1 point
- $\binom{35}{4}$   
  $\binom{35}{3}$   
  $\binom{36}{3}$   
  $\binom{36}{4}$
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
 $\binom{35}{3}$