Discrete Mathematics (BCSC 1010)

Assignment-4

Permutations and Combinations

Q1. Suppose that a salesman has to visit eight different cities. He must begin his trip in a specified city, but he can visit the other seven cities in any order he wishes. How many possible orders can the salesman use when visiting these cities?

Q2. A group of 30 people have been trained as astronauts to go on the first mission to Mars. How many ways are there to select a crew of six people to go on this mission (assuming that all crew members have the same job)?

Q3. Nine chairs are numbered 1 to 9. Three women and four men wish to occupy one chair each. First the women chose the chairs from amongst the chair marked 1 to 5; and then the men select the chairs from amongst the remaining. How many possible arrangements are there?

Q4. Suppose that there are eight runners in a race. The winner receives a gold medal, the second-place finisher receives a silver medal, and the third-place finisher receives a bronze medal. How many different ways are there to award these medals, if all possible outcomes of the race can occur and there are no ties?

Q5. Suppose you have developed a software application and you need to create a 4-digit password for the security reasons such that password can have the digits 0 to 9, and no digit can be repeated. How many different passwords can you create?

Q6. An ice cream parlour offers 5 different flavours of ice cream, and customers can choose 2 scoops. How many different combinations of ice cream can a customer order?

Q7. There are 5 students, and you want to arrange them in a line for a class presentation. However, two students, Alice and Bob, refuse to stand next to each other. How many ways can you arrange the students in this case?