INTRODUCTION TO FORMAL PROOF & ADDITIONAL FORMS OF PROOF

The formal proof can use

1.Inductive proof

2.Deductive proof

Inductive proof

It is a recursive kind of proof which consist of sequence of parameterized ststements that use the statement ,itself with lower values of its parameter

Deductive proof

It consist of sequence of statements given with logical reasoning ,in order to prove the first statement is called hypothesis.

Various forms of Proof

The additional forms of proof can be explained with the help of examples

1) Proof about sets

2) Proof by contracdiction

3) Proof by counter example

Proof about sets

The set is a collection of elements or items .By giving proof about the set we try to prove certain properties of the sets .

For example :

If there are two expressions A& B and we want to prove that both expressions A&B are equivalent

Let

PUQ = QUP

(A) (B)

Then prove A=B ,we need to prove

PUQ=QUP

That means an element x is in A if and only if it is in B

Proving LHS

1.x is in PUQ

2.x is in P or x is in Q

3.x is in Q or X is in P

4.x is in QUP

Like that we can prove RHS

1.x is in Q or X is in P

2.x is in QUP

3.x is in PUQ

4)x is in P or x is in Q

Hence

PUQ=QUP ,Thus A=B is true as element x is in B if and only if x is in A

Proof by contradiction

In this type of proof ,for the statement of the form is A & B ,we start with statement A is not true and thus by assuming false A.We try to get the conclusion of statement B .

When it becomes impossible to reach statement B ,we contradict ourself and accept that A is true

Example :

Prove that PUQ=QUP

Proof

Initially we assume that PUQ=QUP is not true.

Now consider that x is in Q or x is in PUQ

But this also implies that x is in QUP according to definition of union

Hence the assumption which are made initailly is false

Thus

PUQ=QUP is proved

Proof by counter Example

In order to prove certain statements ,we need to see all possible conditions in which that statement remains true .There are some situations in which that statement cannot be true

Example

A mod B = B mod A

Proof

Consider A=2 and B=3

2 mod 3 is not equal to 3 mod 2