

Explain De-Morgan's theorem with suitable example.

RGPV PYQ

De Morgan's Theorems

De Morgan's theorems are two fundamental rules in logic that describe the relationship between negation, conjunction, and disjunction. They are named after Augustus De Morgan, a Scottish mathematician and logician who formulated them in the mid-19th century.

First De Morgan's Theorem:

Theorem: $\neg(P \wedge Q) = (\neg P) \vee (\neg Q)$

This theorem states that the negation of a disjunction is equivalent to the conjunction of the negations of the individual propositions.

Example:

Consider the statement:

"It is not the case that it is either raining or windy today."

Using the first De Morgan's theorem, we can rewrite this statement as:

It is raining or it is cold, or both.

This means that the statement "It is not the case that it is raining and it is cold" is equivalent

Explain De-Morgan's theorem with suitable example.

to the statement "It is raining, or it is cold, or both".

Second De Morgan's Theorem:

Theorem: $\neg(P \vee Q) = (\neg P) \wedge (\neg Q)$

This theorem states that the negation of a disjunction is equivalent to the conjunction of the negations of the individual propositions.

Example:

Consider the statement:

I am not going to the party or I am not going to the concert.

Using the second De Morgan's theorem, we can rewrite this statement as:

I am going to the party and I am going to the concert.

This means that the statement "I am not going to the party or I am not going to the concert" is equivalent to the statement "I am going to the party and I am going to the concert".

Explain De-Morgan's theorem with suitable example.

References:

- "Discrete Mathematics" by Ronald L. Graham, Bruce L. Graham, and Glenn F. Flanigan (2009): Chapter 4, Section 4.4
- "Logic for Computer Science" by John Hopcroft, Hennie M. Saphiro, and Jeffery D. Ullman (2006): Chapter 2, Section 2.2

Related posts:

1. 10's Complement | Prof. Jayesh Umre
2. Hexadecimal TO Octal | Prof. Jayesh Umre
3. 1's Complement | Prof. Jayesh Umre
4. 4:1 Multiplexer| Block and circuit diagram | function table | Prof. Jaye...
5. 9's Complement | Prof. Jayesh Umre
6. Half Adder | Prof. Jayesh Umre
7. Binary to Octal Conversion | Prof. Jayesh Umre
8. Hexadecimal to Decimal | Prof. Jayesh Umre
9. Binary to Decimal | Prof. Jayesh Umre
10. 2's Complement | Prof. Jayesh Umre
11. Substraction by 2'sComplement | Prof. Jayesh Umre
12. Multiplexer | N:1 | 2:1| Block & Circuit diagram | Function table | Prof...
13. FLip Flop | Basic Circuit diagra | Prof. Jayesh Umre
14. K-MAP SOP 4 variables | Prof. Jayesh Umre
15. Binary Addition 4bit 8bit GATE UGC NET | Prof. Jayesh Umre
16. Binary Substraction | GATE UGC NET | Prof. Jayesh Umre
17. Binary Division | GATE UGC NET| Prof. Jayesh Umre
18. Octal to Hexadecimal | | Prof. Jayesh Umre
19. Decimal to Octal Conversion| Prof. Jayesh Umre

Explain De-Morgan's theorem with suitable example.

- 20. Full Adder | Block diagram | Truth table | Circuit diagram | Prof. Jayes...
- 21. Demultiplexer | 1:N | 1:2 | Prof. Jayesh Umre
- 22. Binary Multiplication | GATE UGC NET | Prof. Jayesh
- 23. K-MAP POS form 3 variables | GATE UGC NET | Prof. Jayesh Umre
- 24. Convert the following numbers to Binary, Decimal, Hexadecimal
- 25. Simplify the following expression using Boolean algebra: $A'BC + AC$
- 26. Explain master slave flip-flop in detail.
- 27. Explain BCD adder in detail.