QUEZON CITY UNIVERSITY

COLLEGE OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

MS101 – DISCRETE MATHEMATICS PROJECT

NAME: LOPEZ VITO, ROLLY JR F.

STUDENT NO: 22-0571

YEAR/SECTION: SBIT-3J

DATE: NOVEMBER 22, 2024

SCORE	PERCENTAGE

QUEZON CITY UNIVERSITY

COLLEGE OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

Assignment: Construct truth table; determine the properties of sentence.

1. **p→q**

p	q	p→q
T	T	T
T	F	F
F	T	T
F	F	T

Properties: Satisfiable

2. **(p V ~p) ∧ (q∧ ~ q)**

p	q	~p	~q	(p V ~p)	(q∧ ~ q)	(p V ~p) ∧ (q∧ ~ q)
T	T	F	F	T	F	F
T	F	F	T	T	F	F
F	T	T	F	T	F	F
F	F	T	T	T	F	F

Properties: Contradictory

3. **p↔q**

p	q	p↔q
T	T	T
T	F	F
F	T	F
F	F	T

Properties: Satisfiable

4. **~(p ∧ ~p)**

p	~p	(p ∧ ~p)	~(p ∧ ~p)
T	F	F	T
F	T	F	T

Properties: Valid

5. **~(p V ~p)**

p	~p	(p V ~p)	~(p V ~p)
T	F	T	F
F	T	T	F

Properties: Contradictory

6. **~(p V p)**

p	(p V p)	~(p V p))
T	F	F
F	T	T

Properties: Satisfiable

7. **(p ∧ ~p) V (q ∧ ~q)**

q	p	~p	~q	(p ∧ ~p)	(q ∧ ~q)	(p ∧ ~p) V (q ∧ ~q)
T	T	F	F	F	F	F
T	F	T	F	F	F	F
F	T	F	T	F	F	F
F	F	T	T	F	F	F

Properties: Contradictory

8. ~(p ∨ ~q) ∧ (p ∧ ~q)

p	q	~p	~q	(p ∨ ~q)	~(p ∨ ~q)	(p ∧ ~q)	~(p ∨ ~q) ∧ (p ∧ ~q)
T	T	F	F	T	F	F	F
T	F	F	T	T	F	T	F
F	T	T	F	F	T	F	F
F	F	T	T	T	F	F	F

Properties: Contradictory

9. (p ↔ q) ∨ (q ↔ p)

p	q	(p ↔ q)	(q ↔ p)	(p ↔ q) ∨ (q ↔ p)
T	T	T	T	T
T	F	F	F	F
F	T	F	F	F
F	F	T	T	T

Properties: Satisfiable

10. ~[(p → q) → r]

p	q	r	(p → q)	[(p → q) → r]	~[(p → q) → r]
T	T	T	T	T	F
T	T	F	T	F	T
T	F	T	F	T	F
T	F	F	F	T	F
F	T	T	T	T	F
F	T	F	T	F	T
F	F	T	T	T	F
F	F	F	T	F	T

Properties: Satisfiable

11. [p → (q → r)] ∧ (p → r)

p	q	r	(q→r)	(p→r)	[p→(q→r)]	[p → (q→r)] ∧ (p→r)
T	T	T	T	T	T	T
T	T	F	F	F	F	F
T	F	T	T	T	T	T
T	F	F	T	F	T	F
F	T	T	T	T	T	T
F	T	F	F	T	T	T
F	F	T	T	T	T	T
F	F	F	T	T	T	T

Properties: Satisfiable

12. (p ∧ q)→(p → q)

p	q	(p ∧ q)	(p → q)	(p ∧ q) → (p → q)
T	T	T	T	T
T	F	F	F	T
F	T	F	T	T
F	F	F	T	T

Properties: Valid

13. ~p→p

p	~p	~p → p
T	F	T
F	T	F

Properties: Satisfiable

14. ~p→(q ∨ p)

p	q	~p	(q ∨ p)	~p→(q ∨ p)
T	T	F	T	T
T	F	F	T	T
F	T	T	T	T
F	F	T	F	F

Properties: Satisfiable

15. ~p ∧ ~(~p ∨ ~q)

p	q	~p	~q	(~p ∨ ~q)	~(~p ∨ ~q)	~p ∧ ~(~p ∨ ~q)
T	T	F	F	F	T	F
T	F	F	T	T	F	F
F	T	T	F	T	F	F
F	F	T	T	T	F	F

Properties: Contradictory

16. p ∨ (q → p)

p	q	(q → p)	p ∨ (q → p)
T	T	T	T
T	F	T	T
F	T	F	F
F	F	T	T

Properties: Satisfiable

17. (p ↔ q) ∧ [(~p ∨ ~q) ∧ p]

p	q	~p	~q	(p ↔ q)	(~p ∨ ~q)	[(~p ∨ ~q) ∧ p]	(p ↔ q) ∧ [(~p ∨ ~q) ∧ p]
F	T	F	F	T	F	F	F
F	F	F	T	F	T	T	F
T	T	T	F	F	T	F	F
T	F	T	T	T	T	F	F

Properties: Contradictory

18. (p ↔ q) ∧ (p → q)

p	q	(p ↔ q)	(p → q)	(p ↔ q) ∧ (p → q)
T	T	T	T	T
T	F	F	F	F
F	T	F	T	F
F	F	T	T	T

Properties: Satisfiable

19. **[p → (q → r)] ∧ (r → p)**

p	q	r	(q → r)	[p → (q → r)]	(r→p)	[p→(q→r)] ∧ (r→p)
T	T	T	T	T	T	T
T	T	F	F	F	T	F
T	F	T	T	T	T	T
T	F	F	T	T	T	T
F	T	T	T	T	F	F
F	T	F	F	T	T	T
F	F	T	T	T	F	F
F	F	F	T	T	T	T

Properties: Satisfiable

20. **(p ↔ q) ∨ ~ [(~p ∧ q) ∨ (p ∧ ~q)]**

p	q	~p	~q	(p ↔ q)	(~p ∧ q)	(p ∧ ~q)	[(~p ∧ q) ∨ (p ∧ ~q)]	~[(~p ∧ q) ∨ (p ∧ ~q)]	(p ↔ q) ∨ ~ [(~p ∧ q) ∨ (p ∧ ~q)]
T	T	F	F	T	F	F	F	T	T
T	F	F	T	F	F	T	T	F	F
F	T	T	F	F	T	F	T	F	F
F	F	T	T	T	F	F	F	T	T

Properties: Satisfiable