5. Karnaugh Maps

5.1 A Three-Input Truth Table

Here is a truth table:

A	B	C	W	X	Y	Z
0	0	0	1	0	1	1
0	0	1	1	1	1	0
0	1	0	0	1	1	1
0	1	1	1	0	0	0
1	0	0	1	1	1	0
1	0	1	0	0	0	1
1	1	0	1	0	0	0
1	1	1	1	1	0	1

5.2 Exercises

1. Draw and group the Karnaugh Map for **W**. Derive the expression for **W**.

2. Draw and group the Karnaugh Map for **X**. Derive the expression for **X**.

3. Draw and group the Karnaugh Map for **Y**. Derive the expression for **Y**.

4. Draw and group the Karnaugh Map for **Z**. Derive the expression for **Z**.

5.3 A Four-Input Truth Table

Here is a truth table:

A	B	C	D	P	Q	R	S
0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0
0	0	1	0	0	0	0	0
0	0	1	1	0	0	0	0
0	1	0	0	0	0	0	0
0	1	0	1	0	0	0	1
0	1	1	0	0	0	1	0
0	1	1	1	0	0	1	1
1	0	0	0	0	0	0	0
1	0	0	1	0	0	1	0
1	0	1	0	0	1	0	0
1	0	1	1	0	1	1	0
1	1	0	0	0	0	0	0
1	1	0	1	0	0	1	1
1	1	1	0	0	1	1	0
1	1	1	1	1	0	0	1

5.4 Exercises

5. Draw and group the Karnaugh Map for **P**. Derive the expression for **P**.

6. Draw and group the Karnaugh Map for **Q**. Derive the expression for **Q**.

7. Draw and group the Karnaugh Map for **R**. Derive the expression for **R**.

8. Draw and group the Karnaugh Map for **S**. Derive the expression for **S**.