There are, of course, many possibilities here. This is just one example.

Output: Whether or not to give the cat some food. I'll abbreviate that as FEED.

Inputs:

- If it's currently a feeding time (morning or late evening). I'll abbreviate that as TIME.
- If her current food is still fresh enough. I'll abbreviate that as FRESH.
- If I want to go to bed. I'll abbreviate that as BED.
- If she's meowing. I'll abbreviate that as MEOW.

Natural language description of desired behavior:

If her current food is fresh, she doesn't need new food. Otherwise, if it's her food time I'll give her food as long as either 1) she's meowing (so I realize what time it is) or 2) I want to go to bed (otherwise I know she'll wake me up later).

Truth table:

- FEED being 1 means give her food.
- TIME being 1 means it is currently a feeding time.
- FRESH being 1 means the food is still fresh enough for her to eat.
- BED being 1 means I want to go to bed.
- MEOW being 1 means she's meowing.

TIME	FRESH	BED	MEOW	FEED
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	0
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	0
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0

Boolean Expression:

One possible way to derive an expression is to simplify the natural language description to a point where it can be directly translated to an expression.

For my cat to need feeding, it needs to be a normal feeding time (TIME), it needs to either be my bed time or she needs to be meowing (BED or MEOW), and her existing food needs to be stale (not FRESH). Since all of those conditions need to true,

$$FEED = TIME \cdot (BED + MEOW) \cdot \overline{FRESH}$$