Mathematical Logic – Proofs by Resolution (recap)

$$P \to Q \equiv \neg P \vee Q$$
$$\neg(P \to Q) \equiv P \wedge \neg Q$$

- $P \wedge Q \to R$ processed as a whole
- or process separately P, Q and $\neg R$
- why?

The method:

- negate the statement (why?)

(1) - convert to prenex form
    - move quantifiers as prefix
- convert to skolem form
    - remove quatifiers and replace with functions
- convert to clausal form = conj NF = $(\ldots \vee \ldots) \wedge (\ldots \vee \ldots) \ldots$

(2) - unifications and substitutions

(3) - resolve by (predicates) resolution

(4) - resolution for propositions (explanation)
- examples

(5) - ex 37, example of predicates resolution

- Prolog computation
- example, the English succession
- Prolog execution of above

fact	$B.$	$\{B\}$
definite clause	$B \leftarrow A_1, \ldots, A_n.$	$\{\neg A_1, \ldots, \neg A_n, B\}$
goal	$\leftarrow A_1, \ldots, A_n.$	$\{\neg A_1, \ldots, \neg A_n\}$