

start with:

$$(A \vee \neg B) \Rightarrow (C \wedge (D \Rightarrow A))$$

eliminate  $\Rightarrow$ :

$$\neg(A \vee \neg B) \vee (C \wedge (\neg D \vee A))$$

“push down” negations ( $\neg$ ) using DeMorgan:

$$(\neg A \wedge B) \vee (C \wedge (\neg D \vee A))$$

name expressions enclosed by parentheses with new propositional symbols:

$$\underbrace{(\neg A \wedge B)}_{S_1} \vee \underbrace{(C \wedge \underbrace{(\neg D \vee A)}_{S_2})}_{S_3}$$

rewrite, defining new propositional symbols:

$$\begin{aligned} & (S_1 \Leftrightarrow (\neg A \wedge B)) \\ & \wedge (S_2 \Leftrightarrow (\neg D \vee A)) \\ & \wedge (S_3 \Leftrightarrow (C \wedge S_2)) \\ & \wedge (S_1 \vee S_3) \end{aligned}$$

rewrite each part as CNF, e.g.:

$$\begin{aligned} S_1 \Leftrightarrow (\neg A \wedge B) & \equiv (S_1 \Rightarrow (\neg A \wedge B)) \wedge ((\neg A \wedge B) \Rightarrow S_1) \\ & \equiv (\neg S_1 \vee (\neg A \wedge B)) \wedge (\neg(\neg A \wedge B) \vee S_1) \\ & \equiv (\neg S_1 \vee \neg A) \wedge (\neg S_1 \vee B) \wedge (A \vee \neg B \vee S_1) \end{aligned}$$

put back together, to get entire CNF