MIDTERM 18.12.19

$\forall x \text{child}(x) \Rightarrow \text{Happy}(x) \Leftrightarrow \exists y \text{MotherH}(y,x)$
$\forall x \forall y (\text{parent}(y,x) \wedge \text{child}(x)) \Rightarrow \text{MotherH}(y,x)$
$\text{Mother}(\text{Anna}, \text{Paola})$
$\text{Child}(\text{Paola})$

CNF:
$\neg\text{child}(x) \vee \neg\text{Happy}(x) \vee \text{MotherH}(F(x),x)$
$\neg\text{child}(x) \vee \neg\text{MotherH}(F(x),x) \vee \text{Happy}(x)$
$\neg\text{parent}(y,x) \vee \neg\text{child}(x) \vee \text{MotherH}(y,x)$
$\text{Mother}(\text{Anna}, \text{Paola})$
$\text{Child}(\text{Paola})$

$UB = \{\{\neg\text{child}(x), \neg\text{happy}(x), \text{MotherH}(F(x),x)\}_1, \{\neg\text{child}(x), \neg\text{MotherH}(F(x),x), \text{happy}(x)\}_2, \{\neg\text{parent}(x,y), \neg\text{child}(x), \text{MotherH}(y,x)\}_3, \{\text{Mother}(\text{Anna}, \text{Paola})\}_4, \{\text{Child}(\text{Paola})\}_5\}$.

I have to add: $\forall x \forall y \text{Mother}(x,y) \Rightarrow \text{Parent}(x,y) \rightarrow \{\neg\text{Mother}(x,y), \text{Parent}(x,y)\}_6$
I have to negate the thesis: $\{\neg\text{Happy}(\text{Paola})\}_7$

4 and 7 $\Rightarrow \{\text{Parent}(\text{Anna}, \text{Paola})\}_8$
8 and 3 $\Rightarrow \{\neg\text{child}(\text{Paola}), \text{MotherH}(\text{Anna}, \text{Paola})\}_9$
9 and 2 $\Rightarrow \{\neg\text{child}(\text{Paola}), \text{Happy}(\text{Paola})\}_{10}$
10 and 5 $\Rightarrow \{\text{Happy}(\text{Paola})\}_{11}$
11 and 7 $\Rightarrow \{\}$

Correct.
$\forall x \forall n ((\text{Person}(x) \wedge \text{CF}(n) \wedge \text{Has\_CF}(x,n) \Rightarrow \text{Char}(n,16))$