CS 210 Homework 2

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Problem 1

1. $\exists o\ W(o)$

2. $\exists i\ \exists c\ U(i,c) \wedge P(i)$

3. $\exists c\ M(c) \wedge \neg F(c)$

4. $\forall c\ B(c) \wedge W(c)$

5. $\exists s\ \forall t\ G(s,t)$

6. $\forall s\ \exists c\ A(s,c) \wedge S(c) \wedge O(c)$

7. $\forall c\ \exists i\ F(i,c)$

8. $\forall d\ \exists i\ H(i,d) \wedge G(i)$

9. $\forall l\ (l \neq \text{Daniyal})\ \exists v\ P(l,v)$

10. $\forall q\ \exists t\ C(q,t) \wedge P(q)$

11. $\forall d\ \exists c\ \exists j\ T(d) \wedge B(j,c,d)$

12. $\forall c\ \forall s\ E(c,s) \rightarrow \neg L(s,\text{Starset}) \wedge \neg L(s,\text{Spiritbox})$

13. $\forall h\ \exists s\ \exists q\ H(h) \wedge A(s,q,h)$

14. $\forall i\ \exists p\ \forall s\ M(i) \rightarrow O(i,p) \wedge \neg R(s,p)$

15. $\exists c\ \forall f\ (f \neq \text{Tottenham Hotspur})\ C(c) \wedge F(f)$

16. $\forall s\ \exists c\ U(s,c) \rightarrow P(s)$

Problem 2

1. False
   $\emptyset$ is not in $\{0\}$

2. True
   $A \subset B \equiv\ \forall x\ x \in A \rightarrow x \in B$
   Since the Empty Set has no elements to check for, it is a subset of all sets by definition.

3. False
   if $0 \in \mathbb{Z}\ 0^2 \not> 0$

4. False
   There is not integer whose square is 2

5. False
   Cartesian Product is not associative
   (Assuming that's what it meant, if it's intersection then it is true since that's associative)

Problem 3

1.