Assignment #4 due Wednesday 9/28 by 5pm
Assignment #5 due Monday 10/10 by 5pm.

Exam 1 covers chapters 1, 2, 3 Assignments 1, 2, 3, 4
sheduled for Friday 9/30

Send drafts of homework to Dropbox from now on rather than email.

Quick summary

Subsets

<u>Def</u> $A \subseteq B$ when $(\forall x)(x \in A \to x \in B)$

To prove that $A \subseteq B$, there are 3 basic strategies.

<u>Direct Proof</u> assume $x \in A$, show $x \in B$

<u>Contrapositive</u> assume $x \notin B$, show $x \notin A$.

<u>Contradiction</u> Assume $x \in A$ and $x \notin B$, find a contradiction.

Implications

To prove that $P \to Q$, there are 3 basic strategies.

<u>Direct Proof</u> Assume P is true, show Q is true.

<u>Contrapositive</u> Assume Q' is true, show P' is true.

<u>Contradiction</u> Assume $P \wedge Q'$ is true, find a contradiction.

Set equality

To show that $A = B$, show that $A \subseteq B$ and $B \subseteq A$.

Logical Equivalence

To show that $P \leftrightarrow Q$, show that $P \rightarrow Q$ and $Q \rightarrow P$

#5 on Assignment #4

We want to prove that

$$(B-A)\cup A = B \text{ if and only if } A \subseteq B.$$

In order to do this we need to prove

$(B-A)\cup A = B$ implies $A \subseteq B$. Symbolized by $(\longrightarrow)$

and

$A \subseteq B$ implies $(B-A)\cup A = B$. symbolized $(\longleftarrow)$.

$(\longrightarrow)$ Assume $(B-A)\cup A = B$ and prove $A \subseteq B$.

OR

Assume $A \not\subseteq B$ and prove $(B-A)\cup A \neq B$. * I would use this.

OR

Assume $(B-A)\cup A = B$ but $A \not\subseteq B$ and find contradiction

$(\longleftarrow)$ Assume $A \subseteq B$ and prove $\boxed{(B-A)\cup A = B.}$ * I would use this.

Need to prove $(B-A)\cup A \subseteq B$ and $B \subseteq (B-A)\cup A$

OR

Assume $(B-A)\cup A \neq B$ and prove $A \not\subseteq B$.

OR

Assume $A \subseteq B$ and $(B-A)\cup A \neq B$ and find a contradiction.

So here is a revised template.

($\Rightarrow$) Assume $A \not\subseteq B$. Therefore $(B-A) \cup A \neq B$. $\blacksquare$

($\Leftarrow$) Assume $A \subseteq B$.

$\underline{B-A \cup A \subseteq B}$

$\underline{B \subseteq (B-A) \cup A}$

$\blacksquare$