Assignment 8
CS 411

Q-1 Let,
$x \Rightarrow$ Sam
$y \Rightarrow$ Paul
$z \Rightarrow$ Ryan

Sam plays baseball or Paul plays baseball
$x \vee y$

Sam plays baseball or Ryan doesn't play baseball.
$x \vee \neg z$

Knowledge : $(x \vee y) \wedge (x \vee \neg z)$

x	y	z	$(x \wedge y) \wedge (x \vee \neg z)$	$x \wedge z$	$x \vee y \vee z$
T	T	T	T	T	T
T	T	F	T	F	T
T	F	T	T	T	T
T	F	F	T	F	T
F	T	T	F	F	T
F	T	F	T	F	T
F	F	T	T	F	T
F	F	F	T	F	F

Sam & ryan both play baseball : $x \wedge z$

Atleast one among Sam, Paul & Ryan play baseball: $x \vee y \vee z$.

(i) Sam & ryan both play baseball, in this knowledge base doesn't entail because when x is false & z is false & y is true the knowledge base is true but sentence A is false.

(ii) For sentence B, knowledge base entails as for all when knowledge base is true sentence B is also true.

Q-2

1) if Ana eats, Bret eats

$$x \rightarrow y \quad (x = \text{Ana}, y = \text{Bret})$$

2) Charles eats & Derek doesn't eat

$$x \rightarrow \neg y \quad (x = \text{charles}, y = \text{derek})$$

3) Bret doesn't eat

$$\neg x \quad (x = \text{Bret})$$

4) If Derek doesn't eat at least one among Ana, Earl, & Fred eats

$$\neg x \rightarrow (y \vee z \vee w) \quad (x = \text{Derek}, y = \text{Ana}, z = \text{Earl}, w = \text{Fred})$$

5) If at least one of Charles and Gary eats, Earl doesn't eat.

$$x \vee y \rightarrow \neg z \quad (x = \text{charles}, y = \text{Gary}, z = \text{Earl})$$

Q-3 Ana ⇒ A, Bret ⇒ B, Charles ⇒ C, Derek ⇒ D, Earl ⇒ E, Fred ⇒ F
Gary ⇒ G

(i)	$A \rightarrow B$	given
(ii)	$C \wedge \neg D$	given
(iii)	$\neg B$	given
(iv)	$\neg D \rightarrow (A \vee E \vee F)$	given
(v)	$C \vee G \rightarrow \neg E$	given
(vi)	$\neg A$	MT (i & iii)
(vii)	C	remove & (ii)
(viii)	$\neg D$	remove & (ii)
(ix)	$C \vee G$	Or (vii)
(x)	$\neg E$	MP (v & ix)
(xi)	$\neg A \wedge \neg E$	And (vi & x)
(xii)	$\neg (A \vee E)$	DML (xi)
(xiii)	$(A \vee E) \vee F$	MP (iv & viii)
(xiv)	F	Resolution (xii & xiii)