

Lab Assignment 2 Solutions

1.
 - a)

```
length([], 0).
length([H | T], N) :-
    length(T, M),
    N is M+1.
```
 - b)

```
member(X, [X | List].
member(X, [Element | List]) :-
    member(X, List).
```
 - c)

```
prefix([], List).
prefix([X | Prefix],[X | List]) :-
    prefix(Prefix, List).
```
 - d)

```
suffix(Suffix, Suffix).
suffix(Suffix,[X|List]) :-
    suffix(Suffix,List).
```
 - e)

```
append([],List,List).
append([Element|List1], List2, [Element|List1List2]) :-
    append(List1, List2, List1List2).
```
 - f)

```
sum([],0).
sum([X|L], Sum) :-
    sum(L, SL),
    Sum is X + SL.
```
 - g)

```
product([],1).
product([X|L], Prod) :-
    product(L, PL),
    Prod is X * PL.
```
 - h)

```
split(L, 0, [], L).
split([X|Xs], N, [X|Ys],Zs) :-
    N > 0,
    N1 is N - 1,
    split(Xs, N1, Ys, Zs).
```

2. a) $\neg f(X)$.

$X = 0$;

$X = 1$;

No

b) $\neg f(X), f(Y)$.

$X = 0$

$Y = 0$;

$X = 0$

$Y = 1$;

$X = 1$

$Y = 0$;

$X = 1$

$Y = 1$;

No

c) $\neg f(X), \neg f(Y)$.

$X = 0$

$Y = 0$;

$X = 0$

$Y = 1$;

No

3. `if_then_else(C,S1,S2):-`
 `C,!,`
 `S1.`
`if_then_else(C,S1,S2):-`
 `S2.`

`min(N1,N2,M) :-`
 `if_then_else(N1<N2, M=N1, M=N2).`

4. `delete_first(_, [], []).`

`delete_first(Element, [Element | Rest], Rest) :- !.`

`delete_first(Element, [Other | Rest], [Other | Restofanswer]) :-`
 `delete_first(Element, Rest, Restofanswer).`

5. `bubble_sort(List, Sorted) :-`
 `swap(List, List1),!, bubble_sort(List1, Sorted).`

`bubble_sort(Sorted, Sorted).`

`swap([X, Y | Rest], [Y, X | Rest]) :-`
 `X > Y.`

`swap([Z | Rest], [Z | Rest1]) :-`
 `swap(Rest, Rest1).`