Problem 1

Start

Here's the initial state table

	0 input		1 input	
state	new state	output	new state	output
A	A	0	B	0
B	C	0	D	0
C	E	0	F	0
D	G	1	H	0
E	A	0	B	0
F	C	0	D	0
G	E	0	F	0
H	G	1	H	0

Pass 1

First group together states with the same outputs for their inputs. Since D and H output 1 for input 0, they are placed in one group. All other states output 0 for both inputs, so they are place in a second group.

	0 input		1 input	
state	new state	output	new state	output
A	A	0	B	0
B	C	0	D	0
C	E	0	F	0
E	A	0	B	0
F	C	0	D	0
G	E	0	F	0
D	G	1	H	0
H	G	1	H	0

Pass 2

Note that states B and F go "out of group" for the 1 input. Place them into a third group.

	0 input		1 input	
State	new state	output	new state	output
A	A	0	B	0
C	E	0	F	0
E	A	0	B	0
G	E	0	F	0
B	C	0	D	0
F	C	0	D	0
D	G	1	H	0
H	G	1	H	0

Final partition

Now all states within each any partition go to the same partition for each input. There is no more work to be done.

	0 input		1 input	
state	new state	output	new state	output
A,C,E,G	A,C,E,G	0	B,F	0
B,F	A,C,E,G	0	D,H	0
D,H	A,C,E,G	1	D,H	0

Reduced state table

If you wish, you can rewrite the table into the traditional form

Present state	input	Next state	output
A,C,E,G	0	A,C,E,G	0
A,C,E,G	1	B,F	0
B,F	0	A,C,E,G	0
B,F	1	D,H	0
D,H	0	A,C,E,G	1
D,H	1	D,H	0

Problem 2

Start

Begin with the non-determinate state table. This table is not determinate because S has two possible next states for input 0.

Present state	input	Next state
S	0	S
S	0	T
S	1	S
T	1	U
U	0	A
A	0	A
A	1	A

Subsets

Now derive the subsets, this is actually a multi-step process.

Present state	Input	Next state
S	0	S,T
S	1	S
S,T	0	S,T
S,T	1	S,U
S,U	0	S,T,A
S,U	1	S
S,T,A	0	S,T,A
S,T,A	1	S,U,A
S,U,A	0	S,T,A
S,U,A	1	S,A
S,A	0	S,T,A
S,A	1	S,A

Reduction

Although we obtained a determinate state transition table though the subset method, it can be reduced from six to four states by combining all three accepting states into a single accepting state. By the way, you were not expected to do this for a correct solution.

Present state	input	Next state
S	0	S,T
S	1	S
S,T	0	S,T
S,T	1	S,U
S,U	0	A
S,U	1	S
A	0	A
A	1	A