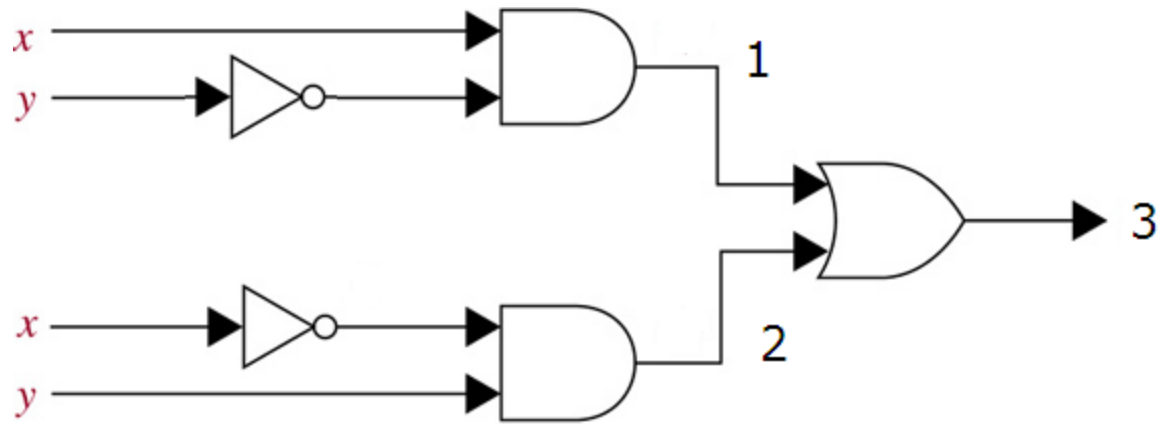


Logic at:

1. 1?

2. 2?

3. 3?



Logic at:

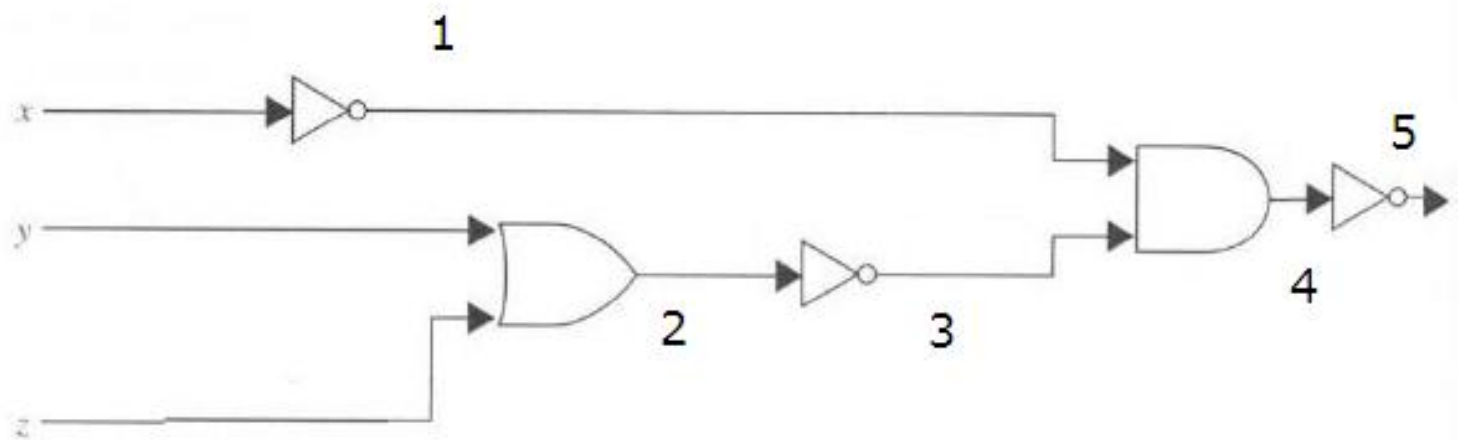
4. 1?

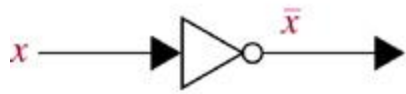
5. 2?

6. 3?

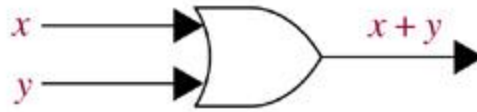
7. 4?

8. 5?

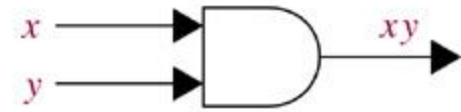




(a) Inverter



(b) OR gate



(c) AND gate

Use the above gates to implement:

9.  $x y + \bar{x} \bar{y}$

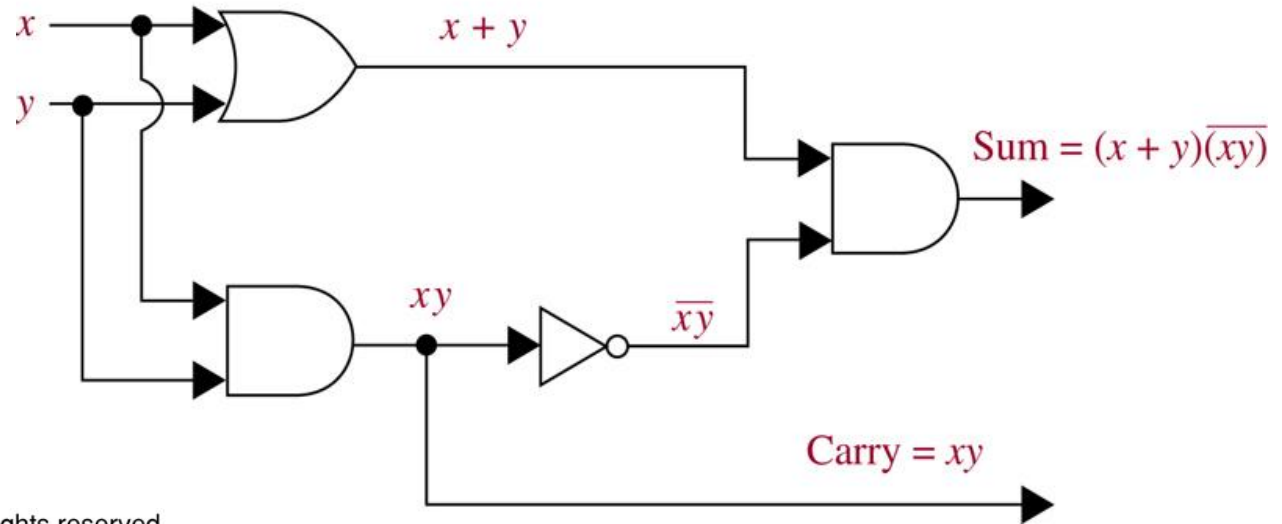
10.  $x y z + \bar{x} \bar{y} z + \overline{x y z}$

11. Add:  $111_2$   
 $+ \underline{011}_2$

$x=1, y=1$

11. Sum?

12. Carry?



© The McGraw-Hill Companies, Inc. all rights reserved.

**TABLE 3**  
Input and  
Output for the  
Half Adder.

Input		Output	
$x$	$y$	$s$	$c$
1	1	0	1
1	0	1	0
0	1	1	0
0	0	0	0

$x=1, y=0, c_i=1$

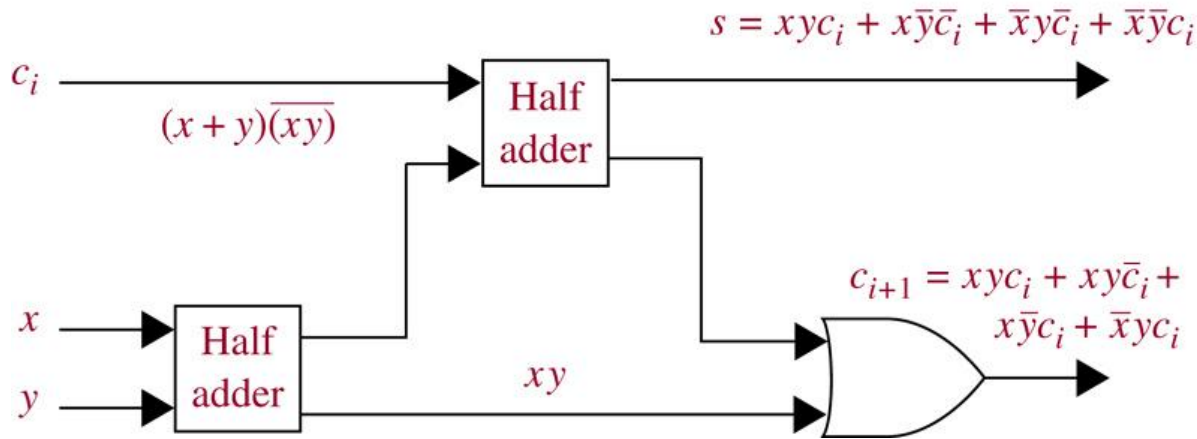
13.  $s$ ?

14.  $c_{i+1}$ ?

**TABLE 4**  
**Input and Output for the Full Adder.**

Input			Output	
$x$	$y$	$c_i$	$s$	$c_{i+1}$
1	1	1	1	1
1	1	0	0	1
1	0	1	0	1
1	0	0	1	0
0	1	1	0	1
0	1	0	1	0
0	0	1	1	0
0	0	0	0	0

© The McGraw-Hill Companies, Inc. all rights reserved.

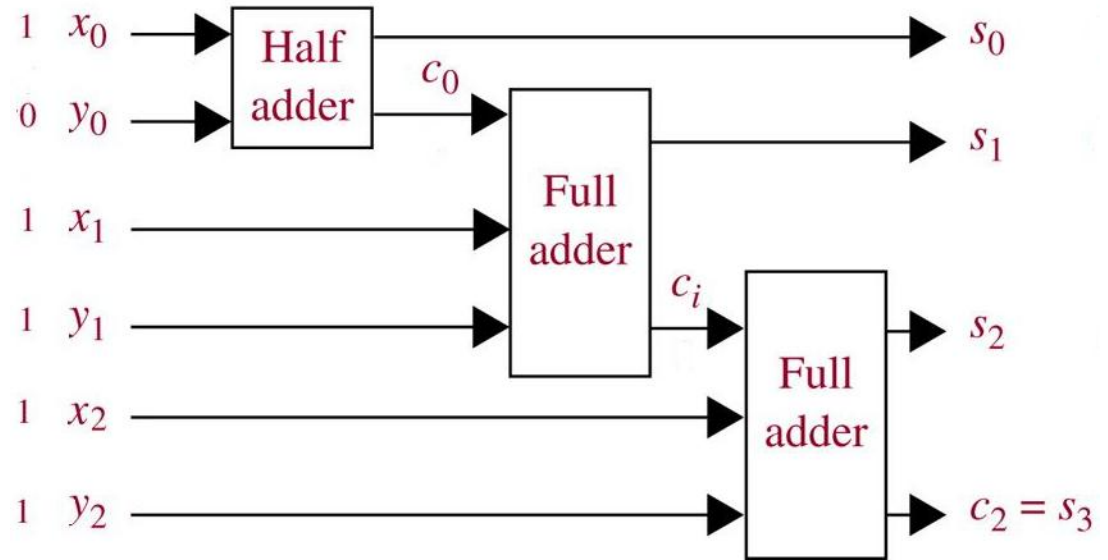


15.  $s_{0-3}$ ?

© The McGraw-Hill Companies, Inc. all rights reserved.

**TABLE 4**  
Input and Output for the Full Adder.

Input			Output	
$x$	$y$	$c_i$	$s$	$c_{i+1}$
1	1	1	1	1
1	1	0	0	1
1	0	1	0	1
1	0	0	1	0
0	1	1	0	1
0	1	0	1	0
0	0	1	1	0
0	0	0	0	0



© The McGraw-Hill Companies, Inc. all rights reserved.

**TABLE 3**  
Input and Output for the Half Adder.

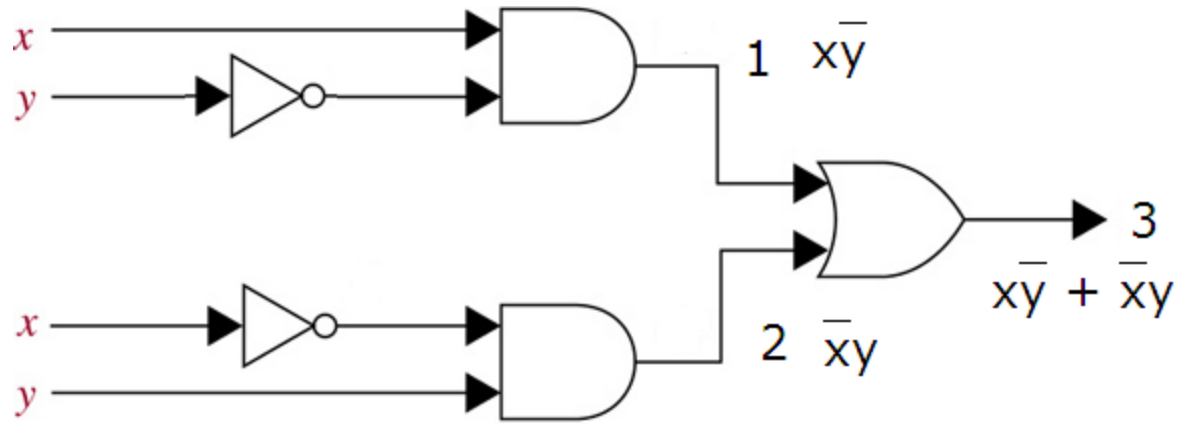
Input		Output	
$x$	$y$	$s$	$c$
1	1	0	1
1	0	1	0
0	1	1	0
0	0	0	0

Logic at:

1. 1?

2. 2?

3. 3?



Logic at:

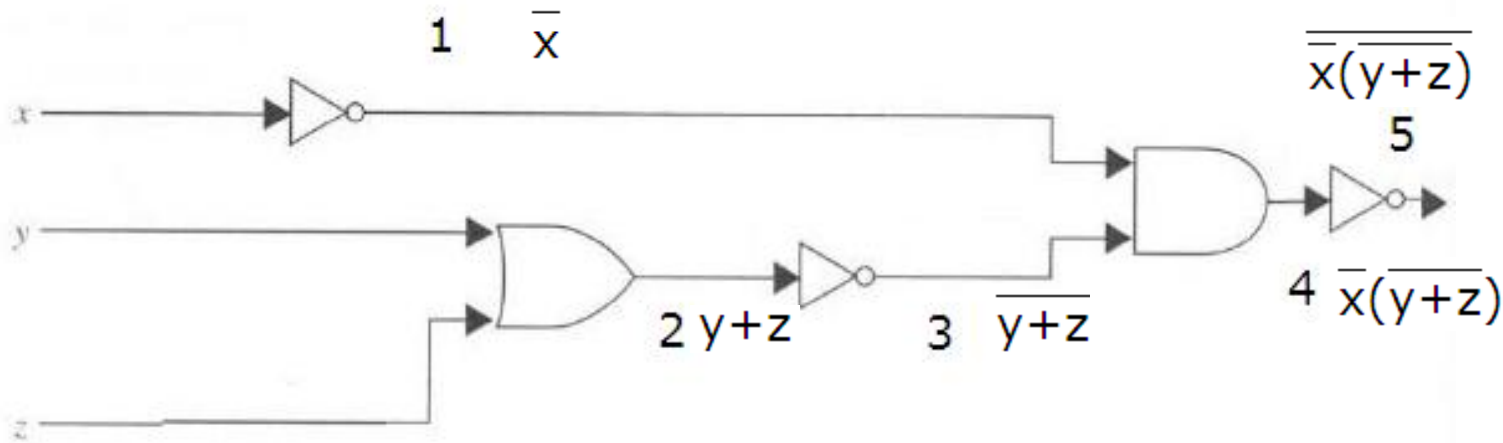
4. 1?

5. 2?

6. 3?

7. 4?

8. 5?

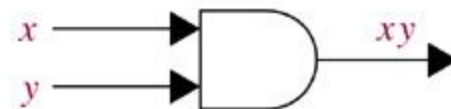




(a) Inverter



(b) OR gate

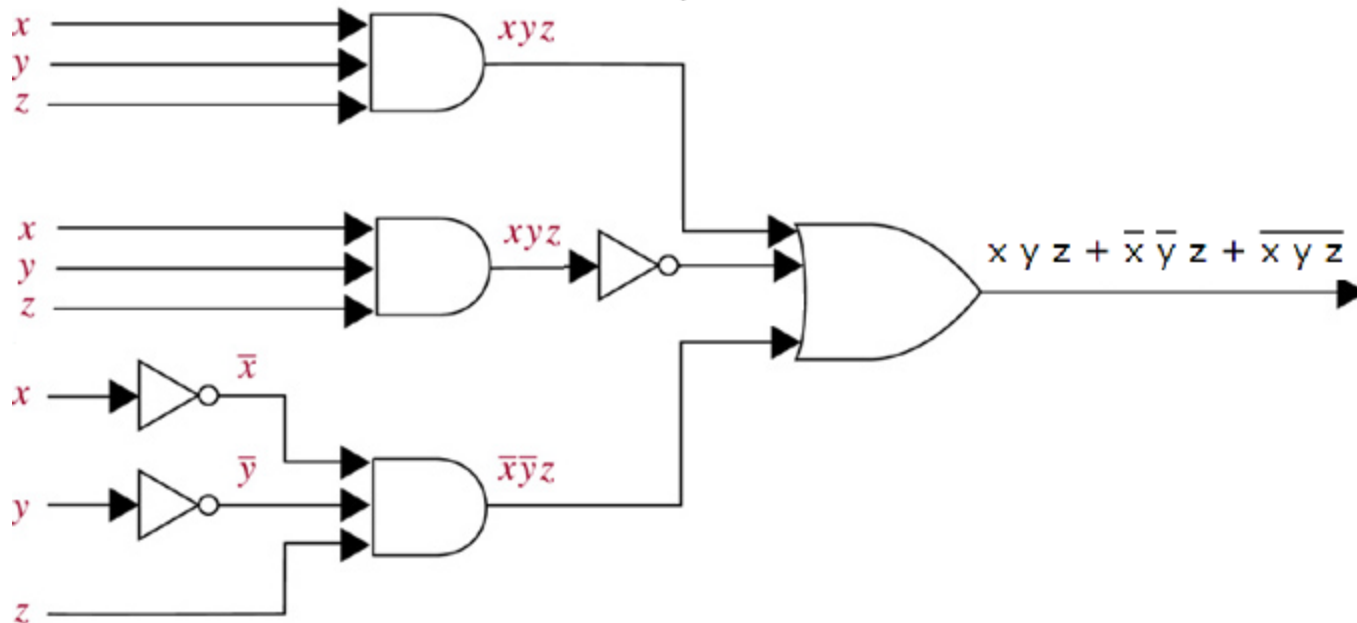
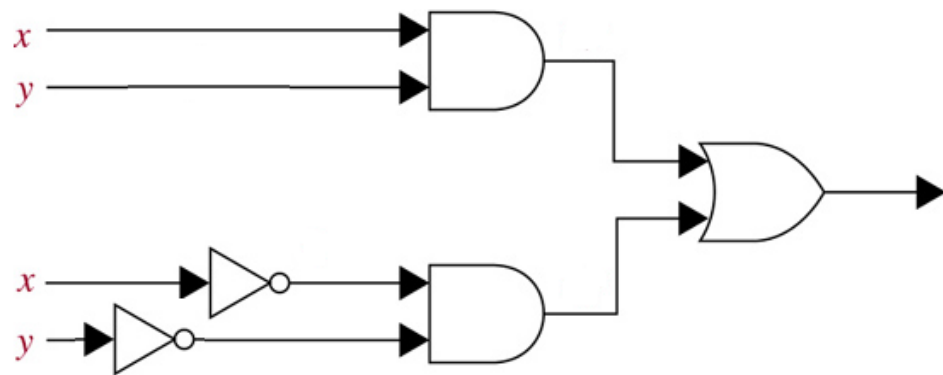


(c) AND gate

Use the above gates to implement:

9.  $x y + \bar{x} \bar{y}$

10.  $x y z + \bar{x} \bar{y} z + \overline{x y z}$

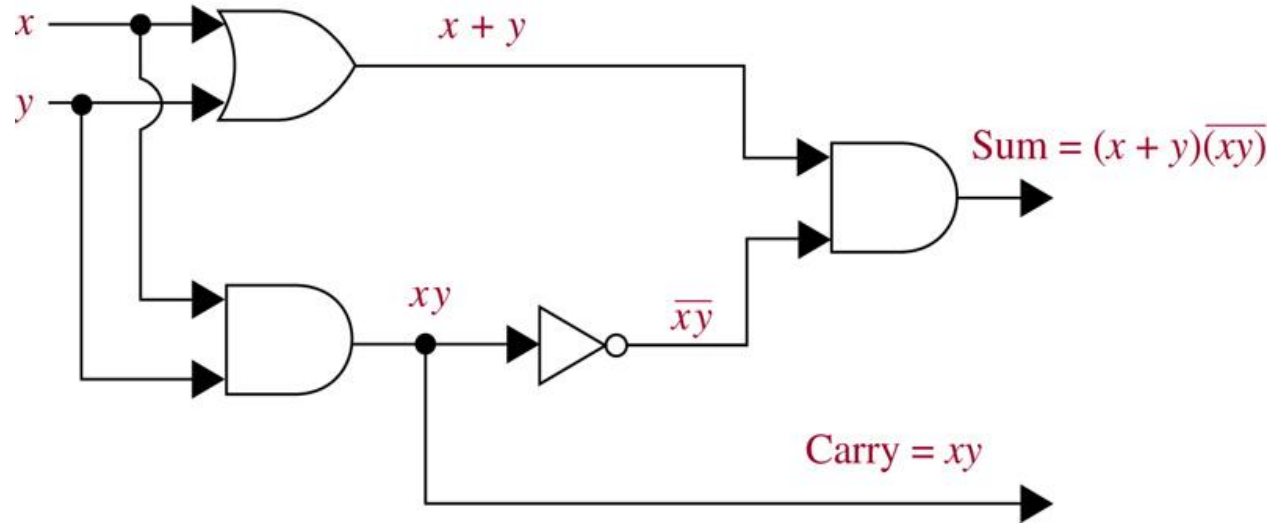


11. Add:  $111_2$   
 $+011_2$   
 $\hline 1010_2$

$x=1, y=1$

11. Sum? 0

12. Carry? 1



**TABLE 3**  
**Input and**  
**Output for the**  
**Half Adder.**

<i>Input</i>		<i>Output</i>	
<i>x</i>	<i>y</i>	<i>s</i>	<i>c</i>
1	1	0	1
1	0	1	0
0	1	1	0
0	0	0	0

$x=1, y=0, c_i=1$

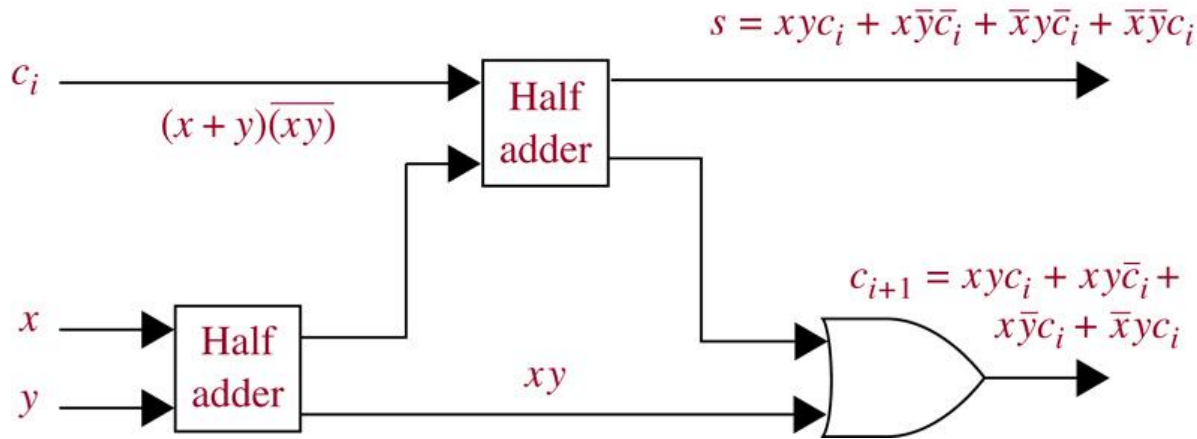
13.  $s = ?$

14.  $c_{i+1} = ?$

**TABLE 4**  
**Input and Output for the Full Adder.**

Input			Output	
$x$	$y$	$c_i$	$s$	$c_{i+1}$
1	1	1	1	1
1	1	0	0	1
1	0	1	0	1
1	0	0	1	0
0	1	1	0	1
0	1	0	1	0
0	0	1	1	0
0	0	0	0	0

© The McGraw-Hill Companies, Inc. all rights reserved.



15.  $s_{3-0}$ ? 1101

