

## What Does This Programming Do?

Strings can contain 0 or more characters and the indexed position starts with 0 at the first character. An empty string has a length of 0. Errors occur if accessing a character that is in a negative position or equal to the length of the string or larger. The `len(A)` function will find the length of the string which is the total number of characters. Strings are identified with surrounding double quotes. Use `[ ]` for identifying the characters in a substring of a given string as follows:

`S = "ACSL WDTPD"` (S has a length of 10 and D is at location 9)

`S[:3] = "ACS"` (take the first 3 characters starting on the left)

`S[5:] = "WDTPD"` (take the last 5 characters starting on the right)

`S[2:6] = "SL WD"` (take the characters starting at location 2 and ending at location 6)

`S[0] = "A"` (position 0 only).

String concatenation is accomplished using the `+` symbol

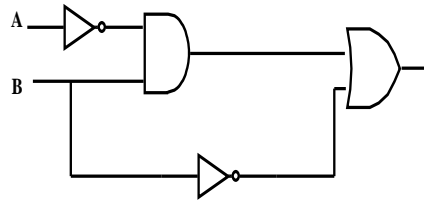
What value is printed when the following program is run? **ggh**

```
a = "";  
z = "abcdefghijklmnopqrstuvwxy"  
for j = 0 to 24  
    if j / 6 == int ( j / 6 ) then a += z [ j : j ] + z [ j : j + 1 ]  
next j  
for k = 0 to 25  
    if k / 5 == int( k / 5 ) && k / 3 == int( k / 3 ) then  
        a += z [ k : k ] + z [ k : k+3 ]  
    next k  
for k = 0 to 25  
    if a [ k : k ] < "M" then  
        output a [ k : k ]  
    next k  
end
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z

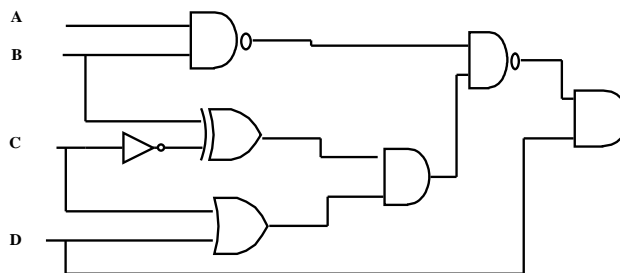
List all the ordered pairs (A,B) that make the following circuit TRUE.

(0,0) (0,1) (1,0)



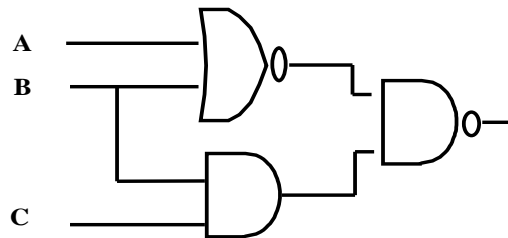
Write a Boolean expression that translates the following circuit.

Do not simplify and only use parentheses when required.

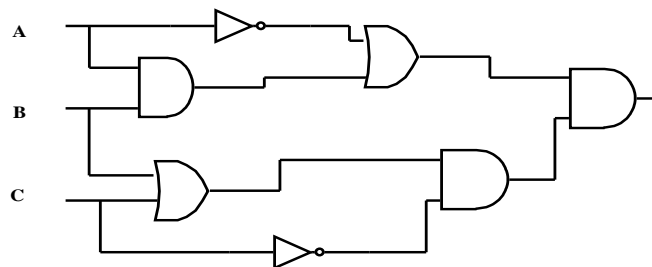


How many ordered triples make the following circuit FALSE?

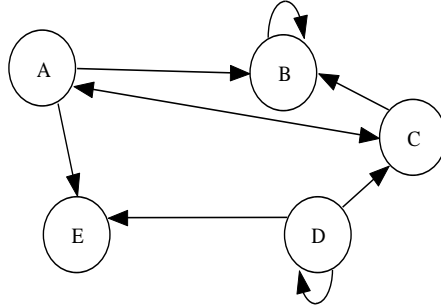
4



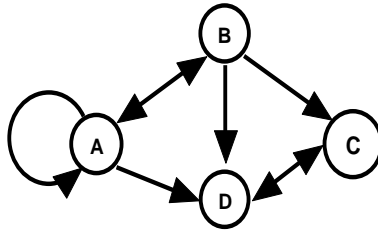
Convert the following diagram to a Boolean expression and simplify



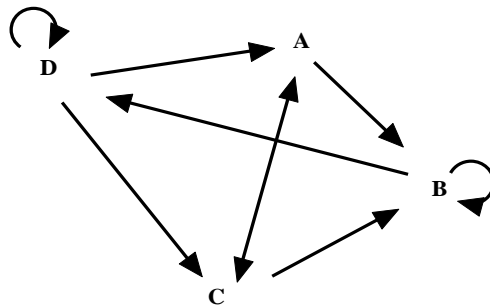
How many paths of length 2 exist in the following graph? 24



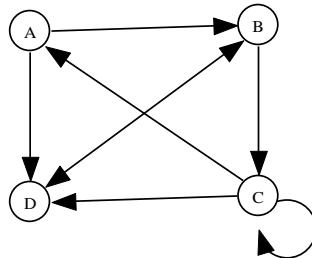
Write the adjacency matrix for the following graph.



How many cycles exist in the following directed graph? 6



How many paths from B of length 3 exist in the following directed graph? 8



What is the final value of S that is printed when the program is run?

```
S      DC      0
N      DC      10
TOP    LOAD    N
      MULT    N
      ADD     S
      STORE  S
      LOAD    N
      SUB     =1
      STORE  N
      BG     TOP
      PRINT   S
      END
```

What is printed when the program is run?

```
A      DC      20
B      DC      10
C      DC      10
D      DC      10
      LOAD    B
      MULT    A
      STORE  B
      LOAD    C
      ADD     B
      STORE  C
      LOAD    D
      ADD     = 1
      STORE  D
      LOAD    C
      SUB     = 100
      PRINT   C
      END
```