1. Graph Theory
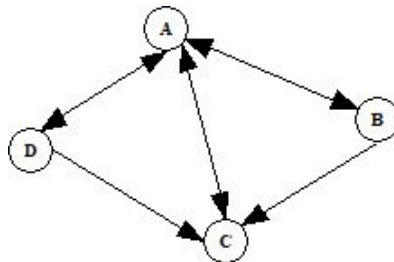
1.

How many 1's are in the adjacency matrix for this directed graph?
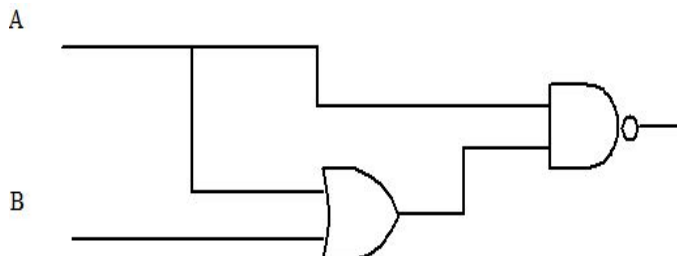

2. Graph Theory

2.
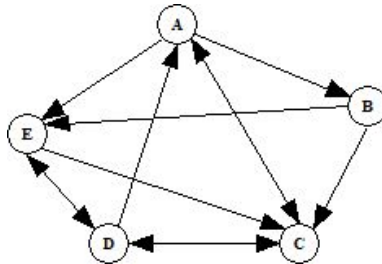
How many cycles are there from vertex A in the directed graph?

3. Digital Electronics

3.

Simplify the Boolean expression represented by the following digital circuit.

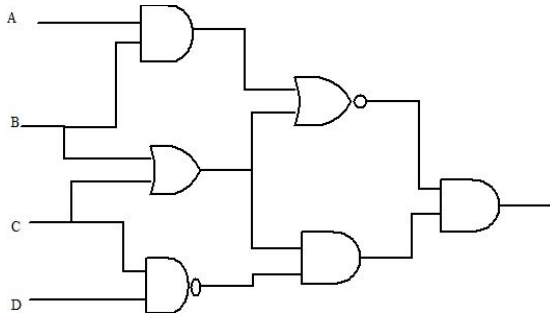## 4. Digital Electronics

How many ordered quadruples make the following digital circuit TRUE?

5. What Does This Program Do? - Strings
How many unique letters are in the output of the following program?

```
A = "HARTFORDISTHEINSURANCECAPITALOFTHEWORLD"
for i  = 0 to len(A) - 1
    if A[i] <= "H" then
        B = B + A[i]
    end if
    if A[i] >= "P" then
        C = C + A[i]
    end if
next i
for i  = 0 to len(B) - 1
    if B[i] != "A" && B[i] != "E" then
        D = D + B[i]
    end if
next i
for i = 0 to len(C) - 1
    if C[i] != "R" && C[i] != "T" then
        E = E + C[i]
    end if
next i
if len(D) <= len(E) then
    for i = 0 to len(D) - 1
        F = F + D[i] + E[i]
    next i
else
    for i = 0 to len(E) - 1
        F = F + D[i] + E[i]
    next i
end if
print F
end
```

4.

5.

1. Graph Theory

写出下面有向图的邻接矩阵中所含"1"的数量。
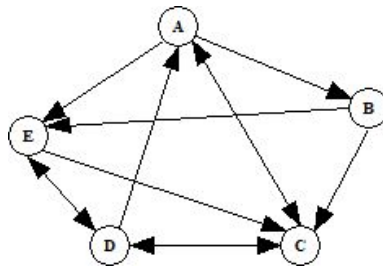
1.
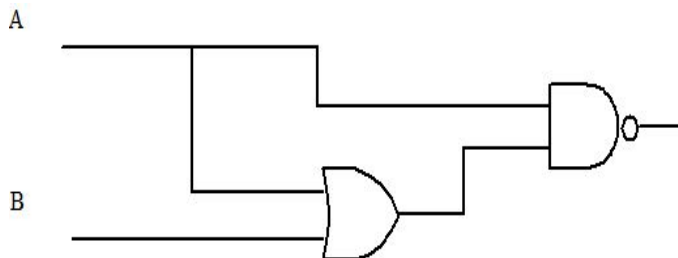
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2. Graph Theory

在以下有向图中，从顶点A出发的有多少个环？
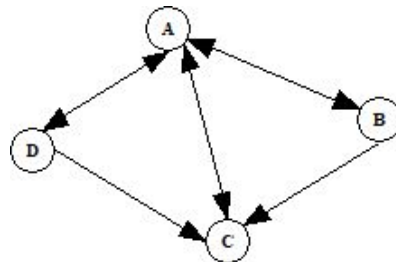
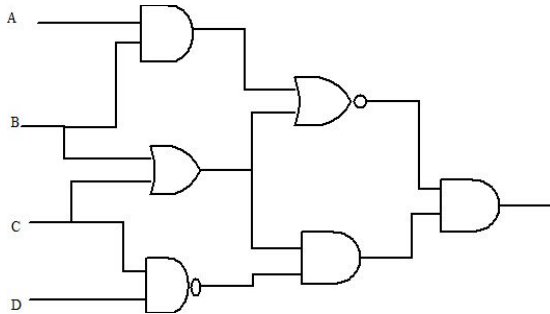**2.**

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3. Digital Electronics

化简以下数字电路表示的布尔表达式。

3.

4. Digital Electronics

有多少个有序四元组可以使得以下数字电路为真？

5. What Does This Program Do? - Strings

请问在以下程序的输出中有多少个不同的字母？

```
A = "HARTFORDISTHEINSURANCECAPITALOFTHEWORLD"
for i = 0 to len(A) - 1
    if A[i] <= "H" then
        B = B + A[i]
    end if
    if A[i] >= "P" then
        C = C + A[i]
    end if
next i
for i = 0 to len(B) - 1
    if B[i] != "A" && B[i] != "E" then
        D = D + B[i]
    end if
next i
for i = 0 to len(C) - 1
    if C[i] != "R" && C[i] != "T" then
        E = E + C[i]
    end if
next i
if len(D) <= len(E) then
    for i = 0 to len(D) - 1
        F = F + D[i] + E[i]
    next i
else
    for i = 0 to len(E) - 1
        F = F + D[i] + E[i]
    next i
end if
print F
end
```

4.

5.