**PROBLEM**: Given an undirected graph, find the number of *connected components*. For example, the graph below with 6 vertices and 3 edges has 3 connected components (the connected components are {A, B, E}, {C, D}, and {F}):



Recall from the Graph Theory category that a connected component in a undirected graph is a set of vertices such that there a path from every vertex to every other vertex

**INPUT:**  Ten undirected graphs. The input for graph will be *N*, the number of vertices, followed by a hexstring that encodes the edges in the graph. *N* will be less than 25.

The encoding is straightforward: convert the string into a bitstring and then look at the bits, starting at the left. The bits indicate edges. The leftmost *N-1* bits are the edges from the vertex A to the *N-1* other vertices; the next *N-2* bits are the edges from the vertex B to the next *N-2* vertices; and so on, until you are looking at the *N*-*1*st vertex. There might be some unused bits in the bitstring; that’s OK… just ignore them. The

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| For example, consider the graph at the right with 4 vertices encoded by the hexstring 2D. The hexstring 2D is **0010 1101**, in binary. The first 3 bits (**001**) indicates that there are no edges between vertex A or B, but there is an edge between A and D. The next 2 bits (**01**) says that that there is no edge between B and C, but there is an edge between B and D. The next bit (**1**) indicates an edge between C and D The last two bits (**01**) are ignored. |  |

**OUTPUT**: For each input graph, print the number of connected components and also the vertices in the component containing the vertex A. The vertices must be listed in alphabetical order.

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| **SAMPLE INPUT:**   1. 6, 9040 2. 4, 2D 3. 4, 24 4. 4, 30 5. 5, 321 6. 5, 312 7. 6, 2021 8. 6, 804E 9. 11, C028100C200449 10. 16, 8000080060204010420108801208E0 | **SAMPLE OUTPUT:**   1. 3 ABE 2. 1 ABCD 3. 2 ACD 4. 2 AD 5. 2 ABDE 6. 2 ACDE 7. 4 AD 8. 2 AB 9. 2 ABDEFGHI 10. 1 ABCDEFGHIJKLMNOP |

**TEST DATA**

***Each answer has two parts – a number followed by a string. Both answers must match exactly. The number and the string may appear in either order, and the comma is optional. The characters in the string must be in alphabetical order.***

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| **TEST INPUT:**   1. 3, 4 2. 4, 11 3. 6, 2017 4. 8, 31415926 5. 5, A00 6. 8, 0000000 7. 2, FF 8. 8, 48C1201A2 9. 9, 242449088 10. 4, 33 | **TEST OUTPUT:**   1. 2, AC 2. 3, A 3. 2, ACDEF 4. 1, ABCDEFGH 5. 3, ABD 6. 8, A 7. 1, AB 8. 3, ACF 9. 3, ADG 10. 2, AD |