$$\delta \le d(v_1) + \qquad \le \Delta$$

$$\delta \le d(v_2) + \qquad \le \Delta$$

$$\vdots$$

$$\delta \le d(v_\nu) \qquad \le \Delta$$

$$\nu\delta \le 2\varepsilon \le \nu\Delta$$

$$\delta \le \frac{2\varepsilon}{\nu} \le \Delta$$

$365 < 10.000$

DEF - Two sets are said to have the same cardinality if there is at least one bijection between them.

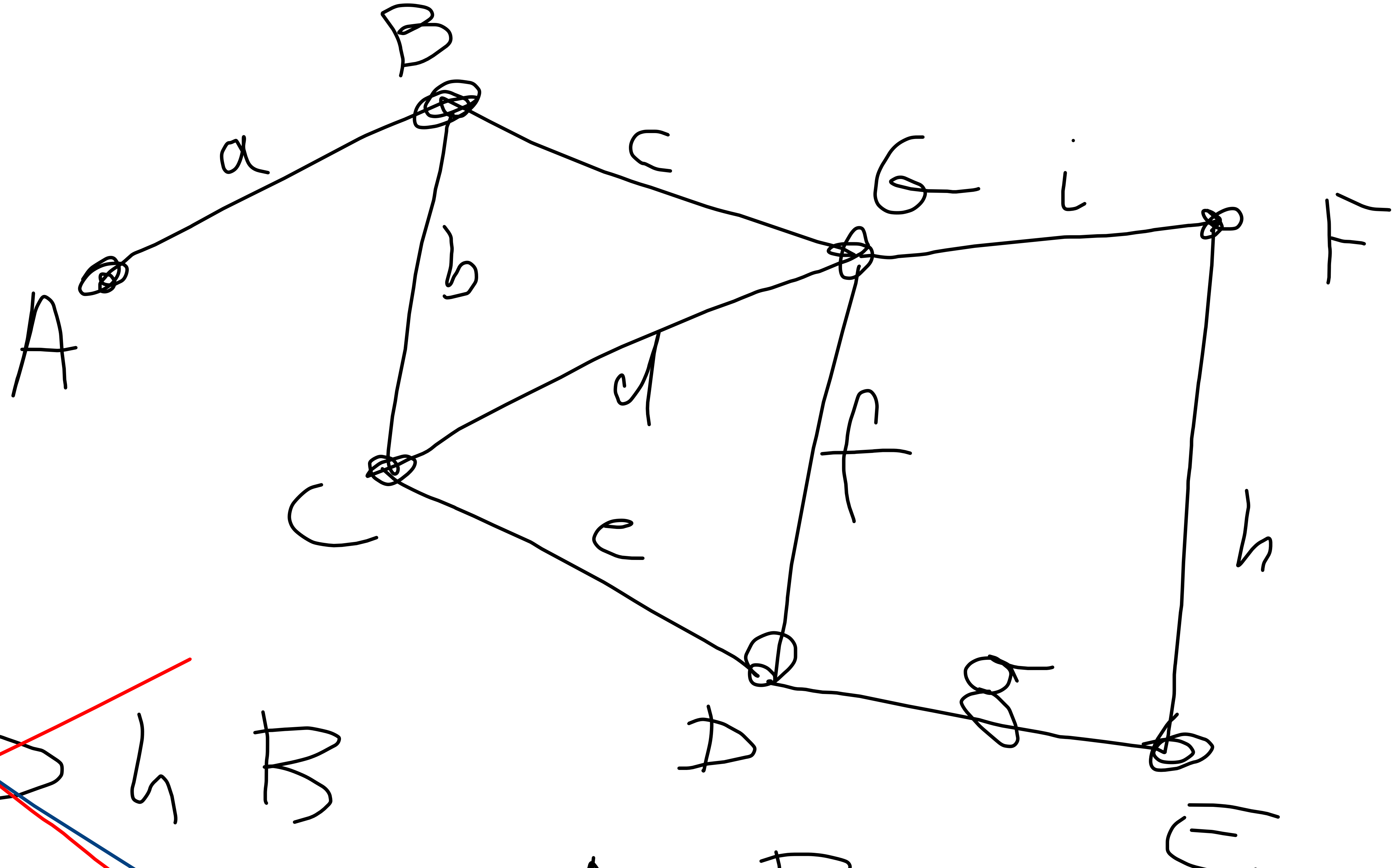
DEF - Given sets X and Y, the cardinality of X is said to be less than or equal to the cardinality of Y

$$|X| \leq |Y|$$

$\#X \leq \#Y$

$\text{card}\, X \leq \text{card}\, Y$

if there is at least one injective map from X to Y.



~~A e D h B~~

A a B c G c B b C

DEF - A (binary) relation $\mathcal{R}$ on a set X is called an equivalence relation if these three conditions hold:

1) $\mathcal{R}$ is reflexive: $\forall x \in X \quad x\mathcal{R}x$ (read: x is in relation $\mathcal{R}$ with x)

2) $\mathcal{R}$ is symmetric: $\forall x, y \in X \quad x\mathcal{R}y \Rightarrow y\mathcal{R}x$

3) $\mathcal{R}$ is transitive: $\forall x, y, z \in X$

$$(x\mathcal{R}y) \wedge (y\mathcal{R}z) \Rightarrow x\mathcal{R}z$$

DEF – A partition of a set X is a set of sets $Q = \{X_1, X_2, ..., X_n\}$, where

1) $X_1, X_2, \dots, X_n$ are subsets of X
2) if $X_i \neq X_j$, then $X_i \cap X_j = \emptyset$
3) $X_1 \cup X_2 \cup \dots \cup X_n = X$

DEF – Given an equivalence relation R on X, the equivalence class of $x \in X$ is the set of all elements in relation R with x

$[x]_R := \{y \in X \mid x R y\}$

THM – Given an equivalence relation $\mathcal{R}$ on X, the set of its equivalence classes is a partition of X.

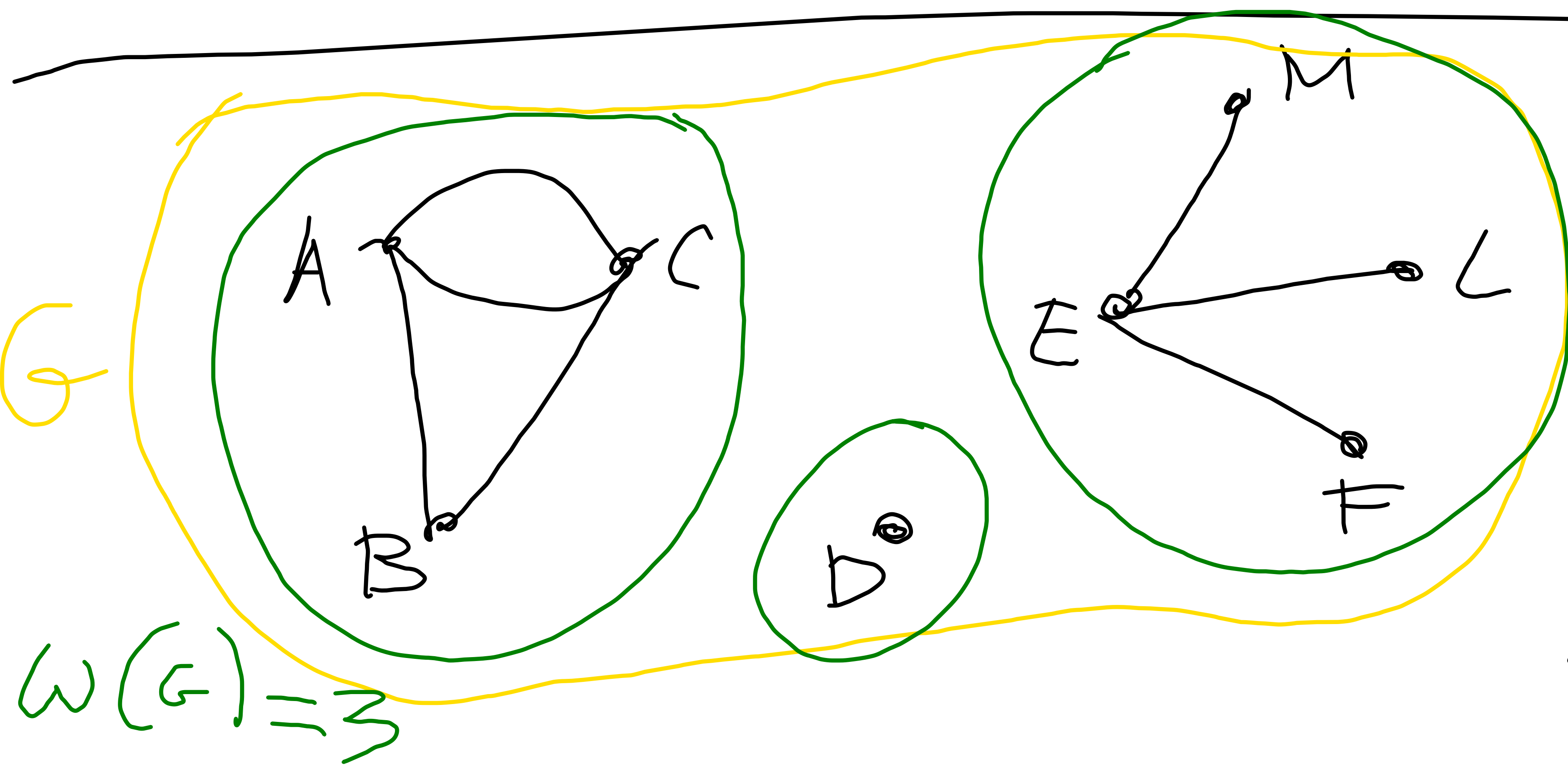
DEF - Given a graph G and a property $\mathcal{P}$ which might hold for some of its subgraphs, we say that a subgraph H of G is maximal with respect to property $\mathcal{P}$ if these two conditions hold:

1) H has property $\mathcal{P}$
2) no subgraph H' such that $H \subset H' \subseteq G$ has property $\mathcal{P}$.

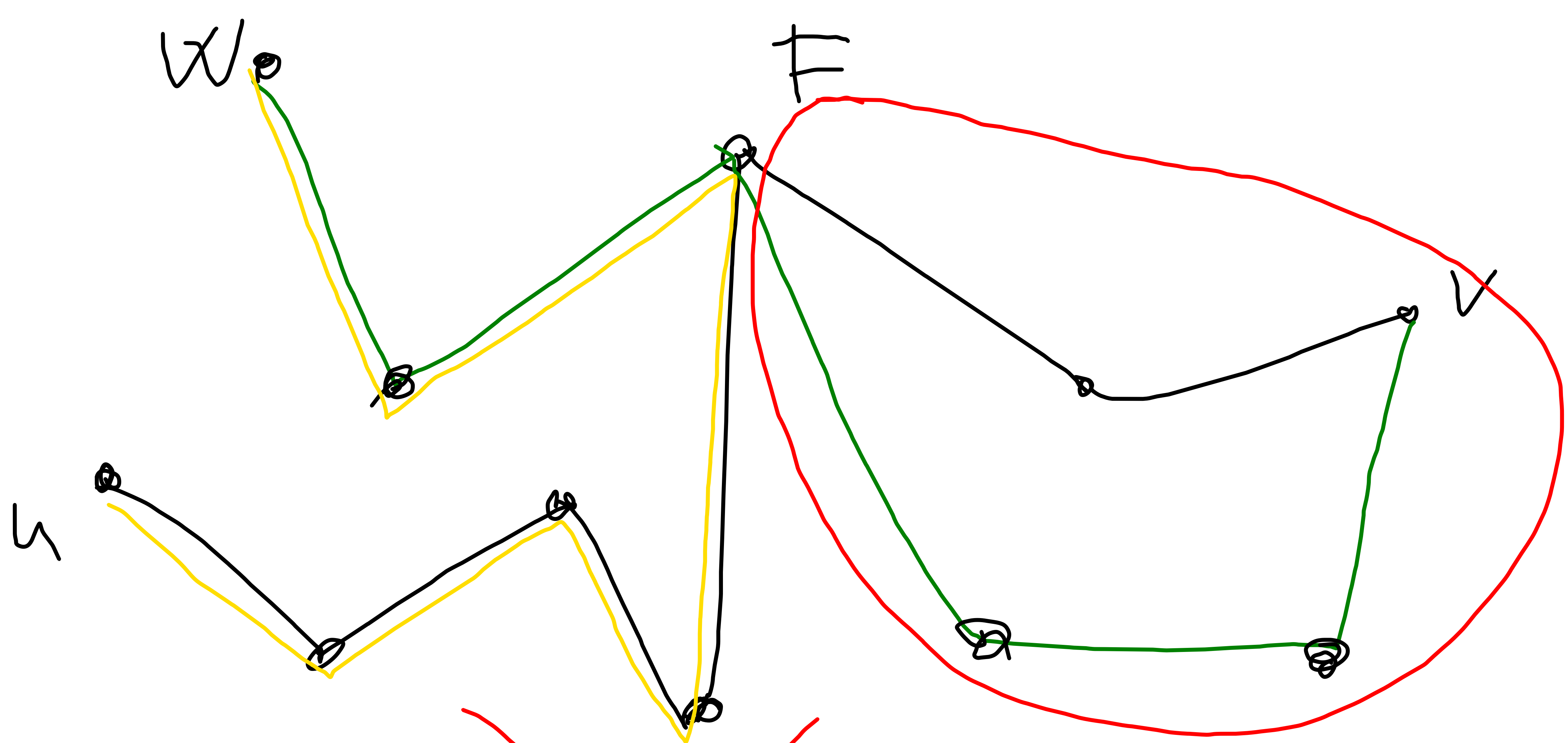
DEF - A graph G is said to be connected if $\forall u, v \in V(G)$ there is a (u,v)-path.

DEF - A component of a graph G is a maximal connected subgraph of G.

$G(\{C,E,F,L,M\})$



$G(\{E,L,M\})$ is connected but not a maximal connected graph, because $G(\{E,F,L,M\})$ is connected and contains it. $G(\{E,F,L,M\})$ is maximal connected



$W_0 = v_0 v_1 \cdots v_9 v_{10} \cancel{v_{11} \cdots v_{26} v_{27}} v_{28} \cdots v_{100}$

$v_{10} = F \qquad v_{27} = F$

$W_1 = v_0 v_1 \cdots v_9 v_{10} v_{28} \cdots v_{100}$

DEF – Given a set X, a distance on X is a map $d : X \times X \longrightarrow \mathbb{R}$ such that these three conditions hold:

1) $\forall x, y \in X \quad d(x,y) \geq 0$ and $= 0 \iff x = y$

2) $\forall x, y \in X \quad d(x,y) = d(y,x)$

3) (triangle inequality)

$\forall x, y, z \in X \quad d(x,z) \leq d(x,y) + d(y,z)$