

HW one, MTH 418, Spring 2016

Ayman Badawi

- QUESTION 1.** (i) Let $V = \{2, 4, 5, 6, 8\} \subset Z_{10}$. Two vertices $v_1, v_2 \in V$ are connected by an edge iff $v_1 * v_2 = 0$ (* here means multiplication module 10). Construct such graph. Is it a $B_{n,m}$ for some n, m ? Find the Girth and the diameter of the graph.
- (ii) Let $V = \{3, 5, 6, 9, 10, 12\} \subset Z_{15}$. Two vertices $v_1, v_2 \in V$ are connected by an edge iff $v_1 * v_2 = 0$ (* here means multiplication module 15). Construct such graph. Is it a $B_{n,m}$ for some n, m ? Find the Girth and the diameter of the graph.
- (iii) Let $V = \{0, 1, 2, 3, 4, 5, 6, 7\} = Z_8$. Two vertices $v_1, v_2 \in V$ are connected by an edge iff $v_1 + v_2 \in \{0, 2, 4, 6\}$. (note that + here means addition module 8). Construct such graph. Show that the graph is not connected. What is $d\{3, 1\}$? What is $d(1, 4)$? Show that the graph is the union of two disjoint subgraphs, G_1, G_2 such that each G_i is a complete induced subgraph.
- (iv) Let $V = \{0, 1, 2, 3, 4, 5, 6, 7, 8\} = Z_9$. Two vertices $v_1, v_2 \in V$ are connected by an edge iff $v_1 + v_2 \in \{0, 3, 6\}$. (note that + here means addition module 9). Construct such graph. Show that the graph is not connected. What is $d\{3, 2\}$? What is $d(5, 8)$? Show that the graph is the union of two disjoint subgraphs, G_1, G_2 where G_1 is a complete induced subgraph and $G_2 = B_{n,m}$ for some n, m is also an induced subgraph.

Due date: Thursday at noon Feb 18, 2016 Faculty information

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