



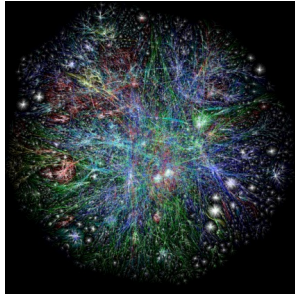
CS 225

Data Structures

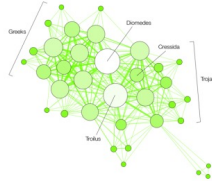
March 27 – Graph Implementations

G Carl Evans

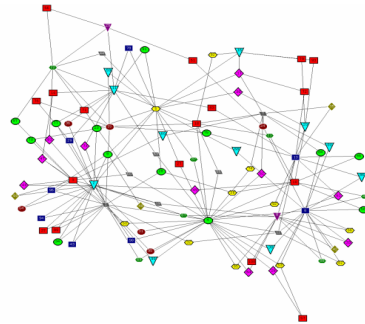
Graphs



HAMLET

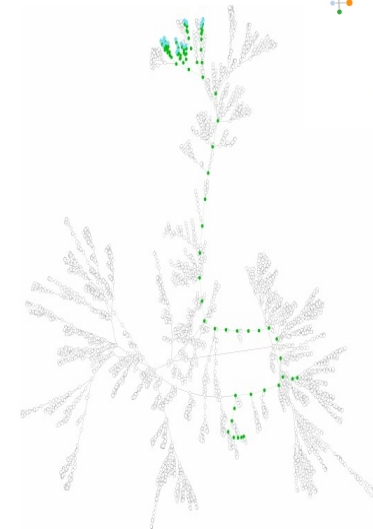
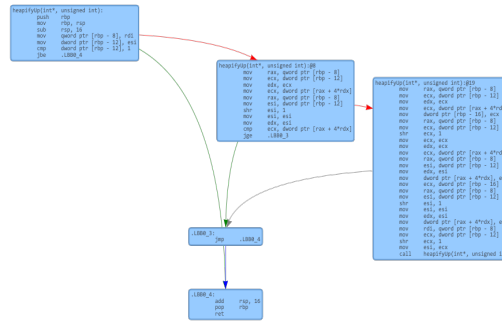
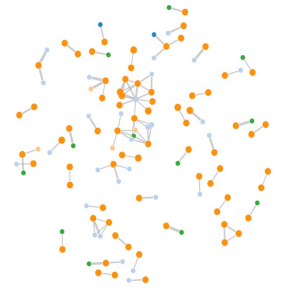
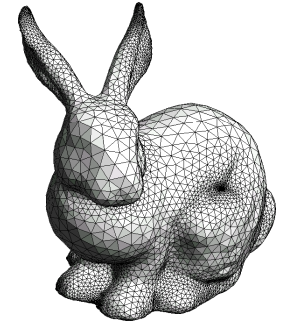


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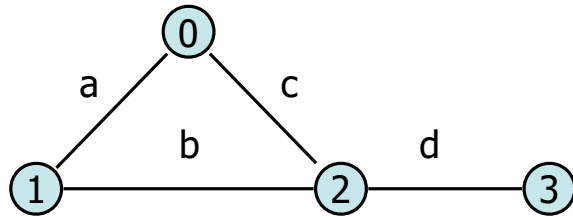
To study all of these structures:

1. A common vocabulary
2. Graph implementations
3. Graph traversals
4. Graph algorithms



Graph Implementation: Edge List

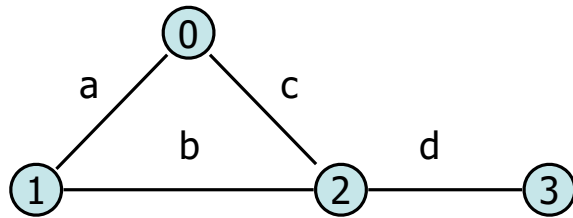
Vertex Collection:



0	0	1	a
1	1	2	b
2	0	2	c
3	2	3	d

Edge Collection:

Graph Implementation: Edge List

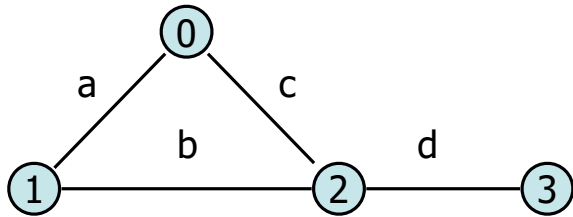


insertVertex(K key):

removeVertex(Vertex v):

0	0	1	a
1	1	2	b
2	0	2	c
3	2	3	d

Graph Implementation: Edge List



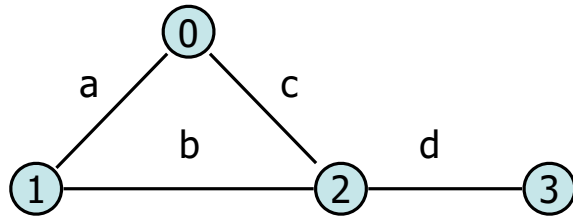
0	0	1	a
1	1	2	b
2	0	2	c
3	2	3	d

incidentEdges(Vertex v):

areAdjacent(Vertex v1, Vertex v2):

`G.incidentEdges(v1).contains(v2)`

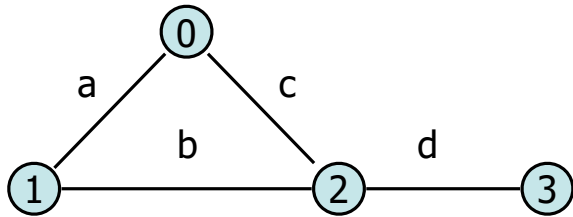
Graph Implementation: Edge List



insertEdge(Vertex v1, Vertex v2, K key):

0	0	1	a
1	1	2	b
2	0	2	c
3	2	3	d

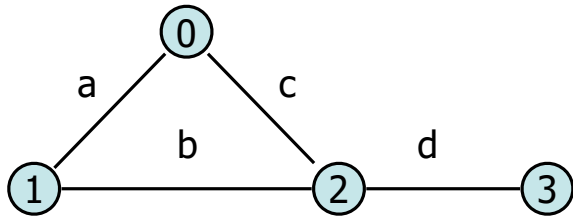
Graph Implementation: Adjacency Matrix



0	0	1	a
1	1	2	b
2	0	2	c
3	2	3	d

	0	1	2	3
0				
1				
2				
3				

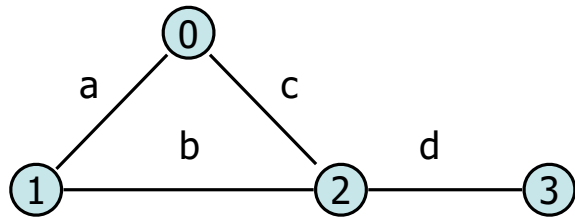
Graph Implementation: Adjacency Matrix



0	0	1	a
1	1	2	b
2	0	2	c
3	2	3	d

	0	1	2	3
0				
1				
2				
3				

Graph Implementation: Adjacency Matrix

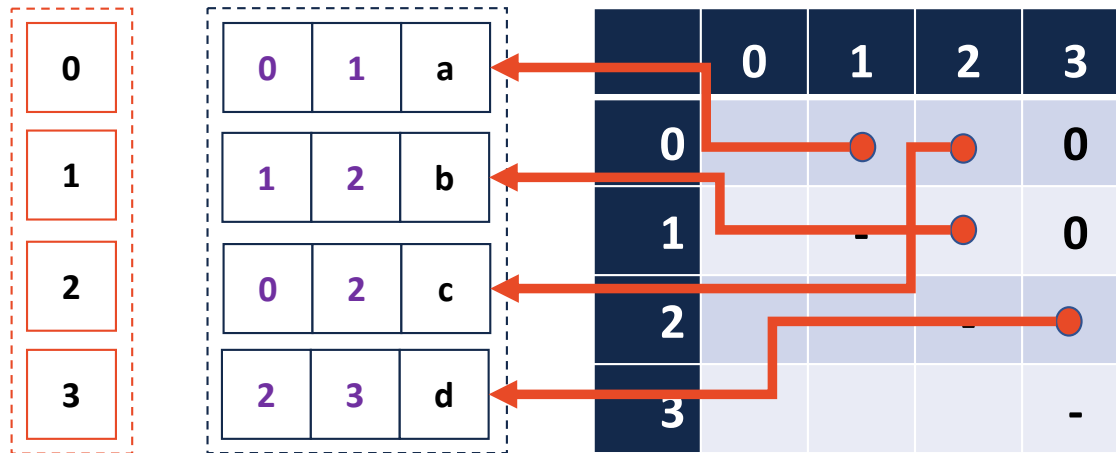
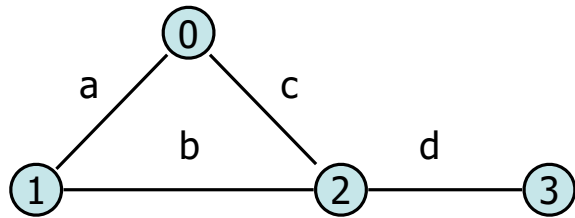


0
1
2
3

0	1	a
1	2	b
0	2	c
2	3	d

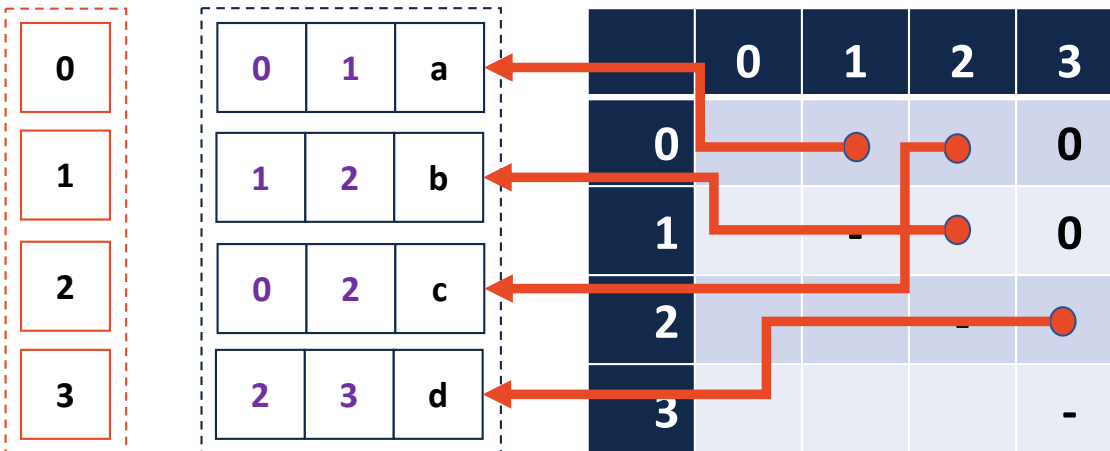
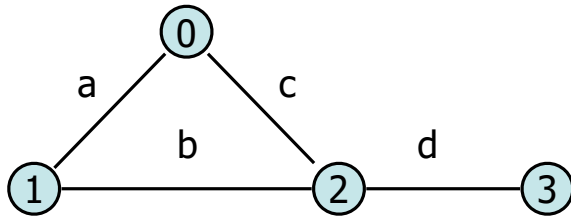
	0	1	2	3
0	-	1	1	0
1		-	1	0
2			-	1
3				-

Graph Implementation: Adjacency Matrix



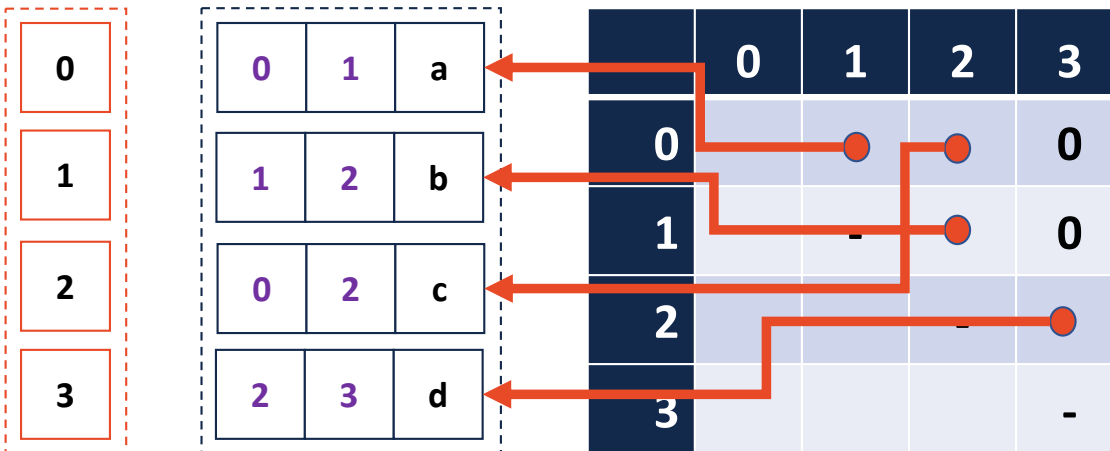
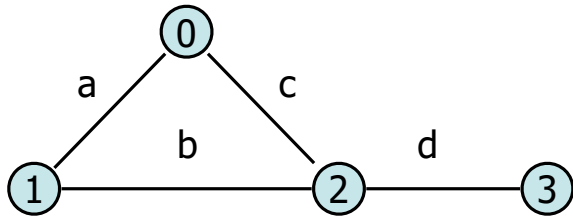
Graph Implementation: Adjacency Matrix

incidentEdges(Vertex v):



Graph Implementation: Adjacency Matrix

areAdjacent(Vertex v1, Vertex v2):



Graph Implementation: Adjacency Matrix

insertEdge(Vertex v1, Vertex v2, K key):

