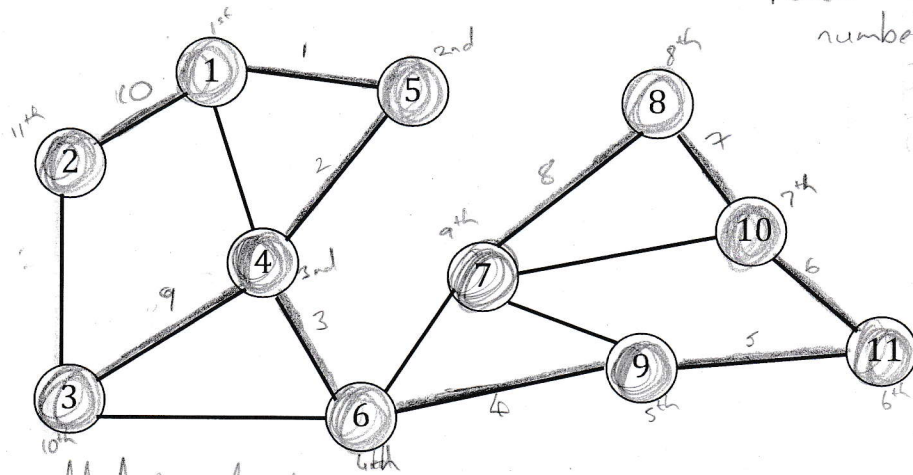


# CSC 106, Summer, Homework #5

## Working Sheets

## Question 1: Graph Algorithms

e) Depth-First Search (**DFS**) [10 marks]



Note: added smallest number to stack first.

List of edges added in order:

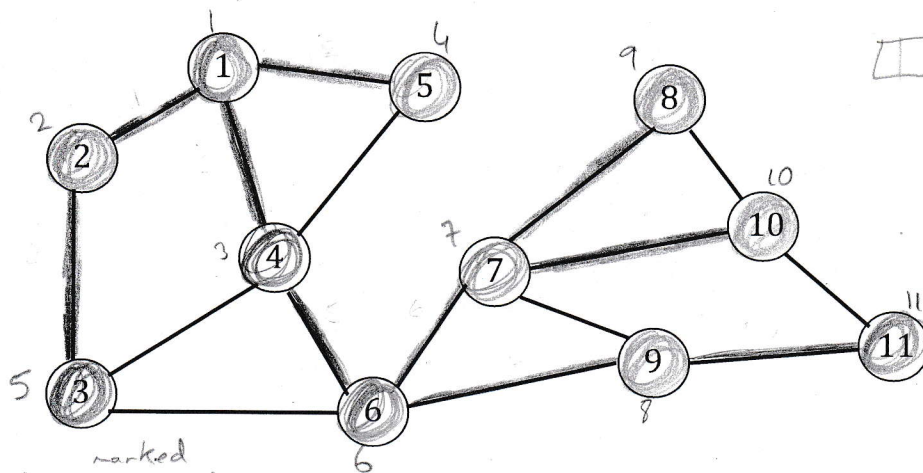
Use of edges added in order.

$(1,5), (5,6), (4,6), (6,9), (9,11), (11,10), (10,8), (8,7), (6,3), (1,2)$

List of vertices in order:

1, 5, 4, 6, 9, 11, 10, 8, 7, 3, 2

f) Breadth-First Search (**BFS**) [10 marks]



List of vertices <sup>marked</sup> in order:

1, 2, 4, 5, 3, 6, 7, 9, 8, 10, 11

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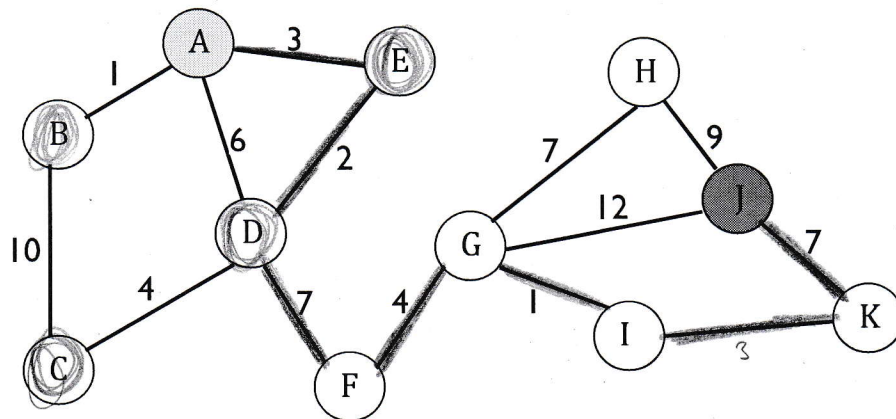
## Question 2: Dijkstra's Algorithm [30 marks]

**current:** NULL

	A	B	C	D	E	F	G	H	I	J	K
Marked:											
Dist.:	0	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.
Prev.:	null	null	null	null	null	null	null	null	null	null	null

**current:** A

	A	B	C	D	E	F	G	H	I	J	K
Marked:	x										
Dist.:	0	1	Inf.	6	3	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.
Prev.:	null	A	null	A	A	null	null	null	null	null	null



Fill the remaining 10 tables [25 Marks]:

**current:** B

	A	B	C	D	E	F	G	H	I	J	K
Marked:	x	x									
Dist.:	0	1	11	6	3	Inf	inf	inf	inf	inf	inf
Prev.:	null	A	B	A	A	null	null	null	null	null	null

current: E

	A	B	C	D	E	F	G	H	I	J	K
Marked:	x	x			x						
Dist.:	0	1	11	5	3	inf	inf	inf	inf	inf	inf
Prev.:	null	A	B	E	A	null	null	null	null	null	null

current: D

	A	B	C	D	E	F	G	H	I	J	K
Marked:	x	x		x	x						
Dist.:	0	1	9	5	3	12	inf	inf	inf	inf	inf
Prev.:	null	A	D	E	A	D	null	null	null	null	null

current: C

	A	B	C	D	E	F	G	H	I	J	K
Marked:	x	x	x	x	x						
Dist.:	0	1	9	5	3	12	inf	inf	inf	inf	inf
Prev.:	null	A	D	E	A	D	null	null	null	null	null

current: F

	A	B	C	D	E	F	G	H	I	J	K
Marked:	x	x	x	x	x	x					
Dist.:	0	1	9	5	3	12	16	inf	inf	inf	inf
Prev.:	null	A	D	E	A	D	F	null	null	null	null

current: G

	A	B	C	D	E	F	G	H	I	J	K
Marked:	x	x	x	x	x	x	x				
Dist.:	0	1	9	5	3	12	16	23	17	28	inf
Prev.:	null	A	D	E	A	D	F	G	G	G	null

current: I

	A	B	C	D	E	F	G	H	I	J	K
Marked:	x	X	X	x	x	x	x		x		
Dist.:	0	1	9	5	3	12	16	23	17	28	20
Prev.:	null	A	D	E	A	D	F	G	G	G	I

current: K

	A	B	C	D	E	F	G	H	I	J	K
Marked:	x	x	x	x	x	x	x		x		x
Dist.:	0	1	9	5	3	12	16	23	17	27	20
Prev.:	null	A	D	E	A	D	F	G	G	K	I

current: H

	A	B	C	D	E	F	G	H	I	J	K
Marked:	x	x	x	x	x	x	x	x	x		x
Dist.:	0	1	9	5	3	12	16	23	17	27	20
Prev.:	null	A	D	E	A	D	F	G	G	K	I

current: J

	A	B	C	D	E	F	G	H	I	J	K
Marked:	x	x	x	x	x	x	x	x	x	x	x
Dist.:	0	1	9	5	3	12	16	23	17	27	20
Prev.:	null	A	D	E	A	D	F	G	G	K	I

**Shortest AJ-path [5 marks]:**

A-E-D-F-G-I-K-J

Distance = 27

see image for full path