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Free Massachusetts Maps & Massachusetts Road Map Travel Guides
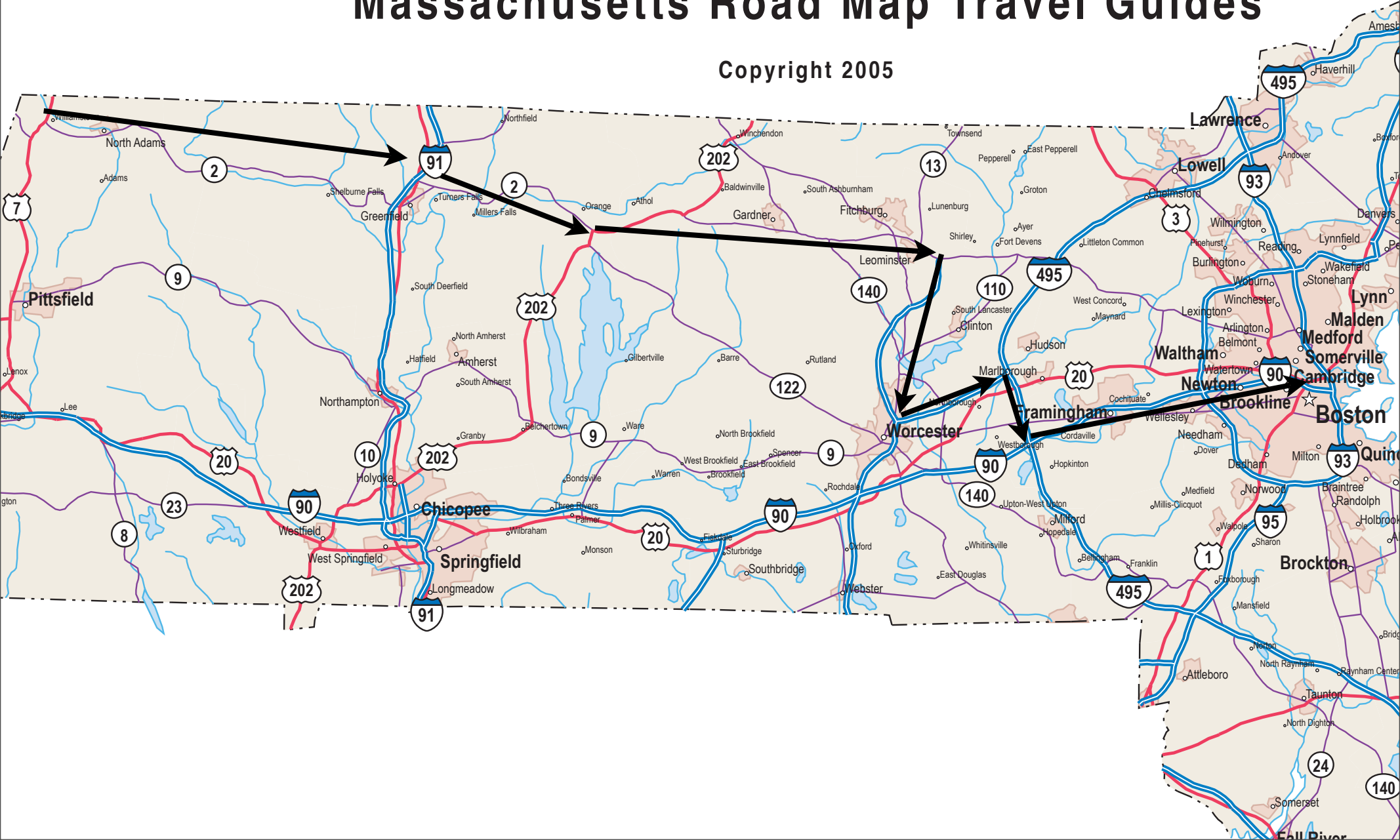
Cities	Neighbors		
Williamstown	Lee 55	Greenfield 79	
Lee	Williamstown 55	Springfield 48	
Greenfield	Williamstown 79	Springfield 46	Leominster 79
Springfield	Greenfield 46	Lee 48	Framingham 78
Leominster	Greenfield 79	Boston 85	Worcester 28
Worcester	Leominster 28	Marlboro 24	
Marlboro	Worcester 24	Framingham 20	
Framingham	Springfield 78	Boston 60	
Boston	Framingham 34	Leominster 85	

Cities	Neighbors		
A	B 55	C 79	
B	A 55	D 48	
C	A 79	D 46	E 79
D	C 46	B 48	H 78
E	C 79	I 85	F 28
F	E 28	G 24	
G	F 24	H 20	
H	D 78	I 60	
I	H 34	E 85	

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B			Distant	A 55	D 48	
C			Distant	A 79	D 46	E 79
D			Distant	C 46	B 48	H 78
E			Distant	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Adjacent = where you can get in one step from "known".

Cities	Best route length	First step	Status	Neighbors		
A*	0	-	Known	B 55	C 79	
B			~~Distant~~ Adjacent	A 55	D 48	
C			~~Distant~~ Adjacent	A 79	D 46	E 79
D			Distant	C 46	B 48	H 78
E			Distant	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Record how long these one step paths would take.

Cities	Best route length	First step	Status	Neighbors		
A*	0	-	Known	B 55	C 79	
B	55		Adjacent	A 55	D 48	
C	79		Adjacent	A 79	D 46	E 79
D			Distant	C 46	B 48	H 78
E			Distant	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Record first step along each of these paths.

Cities	Best route length	First step	Status	Neighbors		
A*	0	-	Known	B 55	C 79	
B	55	B	Adjacent	A 55	D 48	
C	79	C	Adjacent	A 79	D 46	E 79
D			Distant	C 46	B 48	H 78
E			Distant	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Select adjacent city with shortest route

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Adjacent	A 55	D 48	
C	79	C	Adjacent	A 79	D 46	E 79
D			Distant	C 46	B 48	H 78
E			Distant	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Select adjacent city with shortest route

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B*	(55)	B	Adjacent	A 55	D 48	
C	79	C	Adjacent	A 79	D 46	E 79
D			Distant	C 46	B 48	H 78
E			Distant	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Identify adjacent city with shortest route as "Known"

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B*	55	B	Known	A 55	D 48	
C	79	C	Adjacent	A 79	D 46	E 79
D			Distant	C 46	B 48	H 78
E			Distant	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Adjacent = where you can get in one step from "known".

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B*	55	B	Known	A 55	D 48	
C	79	C	Adjacent	A 79	D 46	E 79
D			~~Distant~~ Adjacent	C 46	B 48	H 78
E			Distant	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Update path length by adding path length and last step.

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B*	55	B	Known	A 55	D 48	
C	79	C	Adjacent	A 79	D 46	E 79
D	55 + 48		Adjacent	C 46	B 48	H 78
E			Distant	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Record first step of path.

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B*	55	B	Known	A 55	D 48	
C	79	C	Adjacent	A 79	D 46	E 79
D	103	B	Adjacent	C 46	B 48	H 78
E			Distant	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Select adjacent city with shortest route

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Adjacent	A 79	D 46	E 79
D	103	B	Adjacent	C 46	B 48	H 78
E			Distant	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Select adjacent city with shortest route

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C*	(79)	C	Adjacent	A 79	D 46	E 79
D	103	B	Adjacent	C 46	B 48	H 78
E			Distant	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Identify adjacent city with shortest route as "Known"

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C*	79	C	~~Adjacent~~ Known	A 79	D 46	E 79
D	103	B	Adjacent	C 46	B 48	H 78
E			Distant	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Adjacent = where you can get in one step from "known".

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C*	79	C	Known	A 79	D 46	E 79
D	103	B	Adjacent	C 46	B 48	H 78
E			~~Distant~~ Adjacent	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Record path length and record first step.

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C*	79	C	Known	A 79	D 46	E 79
D	103	B	Adjacent	C 46	B 48	H 78
E	79 + 79	C	Adjacent	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Check lengths to other "Adjacent" neighbors (103 < 79+46).

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C*	79	C	Known	A 79	D 46	E 79
D	103	B	Adjacent	C 46	B 48	H 78
E	158	C	Adjacent	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Select adjacent city with shortest route

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D	103	B	Adjacent	C 46	B 48	H 78
E	158	C	Adjacent	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Identify adjacent city with shortest route as "Known"

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D*	103	B	~~Adjacent~~ Known	C 46	B 48	H 78
E	158	C	Adjacent	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			Distant	D 78	I 60	
I			Distant	H 34	E 85	

Adjacent = where you can get in one step from "known".

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D*	103	B	Known	C 46	B 48	H 78
E	158	C	Adjacent	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H			~~Distant~~ Adjacent	D 78	I 60	
I			Distant	H 34	E 85	

Record path (s) and record first step(s).

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D*	103	B	Known	C 46	B 48	H 78
E	158	C	Adjacent	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H	103+78	B	Adjacent	D 78	I 60	
I			Distant	H 34	E 85	

Select adjacent city with shortest route

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D	103	B	Known	C 46	B 48	H 78
E	158	C	Adjacent	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H	181	B	Adjacent	D 78	I 60	
I			Distant	H 34	E 85	

Identify adjacent city with shortest route as "Known"

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D	103	B	Known	C 46	B 48	H 78
E*	158	C	~~Adjacent~~ Known	C 79	I 85	F 28
F			Distant	E 28	G 24	
G			Distant	F 24	H 20	
H	181	B	Adjacent	D 78	I 60	
I			Distant	H 34	E 85	

Adjacent = where you can get in one step from "known".

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D	103	B	Known	C 46	B 48	H 78
E*	158	C	Known	C 79	I 85	F 28
F			~~Distant~~ Adjacent	E 28	G 24	
G			Distant	F 24	H 20	
H	181	B	Adjacent	D 78	I 60	
I			~~Distant~~ Adjacent	H 34	E 85	

Record path lengths and record first steps.

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D	103	B	Known	C 46	B 48	H 78
E*	158	C	Known	C 79	I 85	F 28
F	158+28	C	Adjacent	E 28	G 24	
G			Distant	F 24	H 20	
H	181	B	Adjacent	D 78	I 60	
I	158+85	C	Adjacent	H 34	E 85	

Select adjacent city with shortest route

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D	103	B	Known	C 46	B 48	H 78
E	158	C	Known	C 79	I 85	F 28
F	186	C	Adjacent	E 28	G 24	
G			Distant	F 24	H 20	
H	181	B	Adjacent	D 78	I 60	
I	243	C	Adjacent	H 34	E 85	

Identify adjacent city with shortest route as "Known"

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D	103	B	Known	C 46	B 48	H 78
E	158	C	Known	C 79	I 85	F 28
F	186	C	Adjacent	E 28	G 24	
G			Distant	F 24	H 20	
H*	181	B	~~Adjacent~~ Known	D 78	I 60	
I	243	C	Adjacent	H 34	E 85	

~~Record~~ Update path lengths and record first steps.

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D	103	B	Known	C 46	B 48	H 78
E	158	C	Known	C 79	I 85	F 28
F	186	C	Adjacent	E 28	G 24	
G			Distant	F 24	H 20	
H*	181	B	Known	D 78	I 60	
I	~~243~~ 181+60	~~C~~ B	Adjacent	H 34	E 85	

Select adjacent city with shortest route

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D	103	B	Known	C 46	B 48	H 78
E	158	C	Known	C 79	I 85	F 28
F	186	C	Adjacent	E 28	G 24	
G			Distant	F 24	H 20	
H	181	B	Known	D 78	I 60	
I	241	B	Adjacent	H 34	E 85	

Identify adjacent city with shortest route as "Known"

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D	103	B	Known	C 46	B 48	H 78
E	158	C	Known	C 79	I 85	F 28
F*	186	C	~~Adjacent~~ Known	E 28	G 24	
G			Distant	F 24	H 20	
H	181	B	Known	D 78	I 60	
I	241	B	Adjacent	H 34	E 85	

Adjacent = where you can get in one step from "known".

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D	103	B	Known	C 46	B 48	H 78
E	158	C	Known	C 79	I 85	F 28
F*	186	C	Known	E 28	G 24	
G			~~Distant~~ Adjacent	F 24	H 20	
H	181	B	Known	D 78	I 60	
I	241	B	Adjacent	H 34	E 85	

Update path lengths and record first steps.

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D	103	B	Known	C 46	B 48	H 78
E	158	C	Known	C 79	I 85	F 28
F*	186	C	Known	E 28	G 24	
G	186+24	C	Adjacent	F 24	H 20	
H	181	B	Known	D 78	I 60	
I	241	B	Adjacent	H 34	E 85	

Select adjacent city with shortest route

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D	103	B	Known	C 46	B 48	H 78
E	158	C	Known	C 79	I 85	F 28
F	186	C	Known	E 28	G 24	
G*	210	C	Adjacent	F 24	H 20	
H	181	B	Known	D 78	I 60	
I	241	B	Adjacent	H 34	E 85	

Identify adjacent city with shortest route as "Known"

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D	103	B	Known	C 46	B 48	H 78
E	158	C	Known	C 79	I 85	F 28
F	186	C	Known	E 28	G 24	
G*	210	C	~~Adjacent~~ Known	F 24	H 20	
H	181	B	Known	D 78	I 60	
I	241	B	Adjacent	H 34	E 85	

Select adjacent city with shortest route

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D	103	B	Known	C 46	B 48	H 78
E	158	C	Known	C 79	I 85	F 28
F	186	C	Known	E 28	G 24	
G	210	C	Known	F 24	H 20	
H	181	B	Known	D 78	I 60	
I	241	B	Adjacent	H 34	E 85	

Identify adjacent city with shortest route as "Known"

Cities	Best route length	First step	Status	Neighbors		
A	0	-	Known	B 55	C 79	
B	55	B	Known	A 55	D 48	
C	79	C	Known	A 79	D 46	E 79
D	103	B	Known	C 46	B 48	H 78
E	158	C	Known	C 79	I 85	F 28
F	186	C	Known	E 28	G 24	
G	210	C	Known	F 24	H 20	
H	181	B	Known	D 78	I 60	
I*	241	B	~~Adjacent~~ Known	H 34	E 85	

Dijkstra's Shortest Path First Algorithm

- Mark starting point as "Known" with length 0.
- Identify each neighbor of start as "Adjacent".
- Set first step of each neighbor of start to itself.
- Set route length of each neighbor to one step distance.
- While you don't know how to reach all the cities:
  - ▸ Select adjacent city with shortest route.
  - ▸ Identify adjacent city with shortest route as "Known".
  - ▸ Mark neighbors of new "Known" city that were "Distant" as "Adjacent".
  - ▸ Update path lengths and record first steps to "Adjacent" neighbors of new "Known" city.