

Creating Shape files for Varanasi

Ammar Bin Zulqarnain

Example Route Sheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S				
Mirzamurad-Mohansarai-Chandpur-Cantt-Kachahari- Babatpur																							
Route NO. (E102)	KM	Total Km	Time	Fare	HLT	First Trip Bus-1	First Trip Bus-2	First Trip Bus-3	First Trip Bus 4	First Trip Bus-5	First Trip Bus 6	Second Trip Bus-1	Second Trip Bus-2	Second Trip Bus-3	Second Trip Bus-4	Second Trip Bus-5	Second Trip Bus-6			Latitude Longitude			
						UP65LT 1393	UP32PN 6687	UP65KT 5046	UP32LT 1799	UP65LT 1398	UP32PN 8716	UP65LT 1393	UP32PN 6687	UP65KT 5046	UP32LT 1799	UP65LT 1398	UP32PN 8716						
MIRZAMURAD ESTATIC	0	0	0:00	0	0	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00			25.284666, 82.780556			
MIRZAMURAD BAZAR	1	1	2:40	10	0	6:02	7:02	8:02	9:02	10:02	11:02	12:02	13:02	14:02	15:02	16:02	17:02			25.285235, 82.776484			
KIT	2	3	4:80	10	0	6:06	7:06	8:06	9:06	10:06	11:06	12:06	13:06	14:06	15:06	16:06	17:06			25.282433, 82.791429			
SADHU KI KUTIYA	1	4	2:40	15	0	6:08	7:08	8:08	9:08	10:08	11:08	12:08	13:08	14:08	15:08	16:08	17:08			25.279853, 82.799645			
RAKHAUNA	2	6	4:80	15	0	6:12	7:12	8:12	9:12	10:12	11:12	12:12	13:12	14:12	15:12	16:12	17:12			25.271908, 82.821388			
RAJATALAB	3	9	7:20	20	0	6:19	7:19	8:19	9:19	10:19	11:19	12:19	13:19	14:19	15:19	16:19	17:19			25.269400, 82.846250			
MOHANSARAI	3	12	7:20	25	0	6:26	7:26	8:26	9:26	10:26	11:26	12:26	13:26	14:26	15:26	16:26	17:26			25.274509, 82.871995			
SAHABABAD	2	14	4:80	25	0	6:30	7:30	8:30	9:30	10:30	11:30	12:30	13:30	14:30	15:30	16:30	17:30			25.277839, 82.896804			
JAGATPUR	2	16	4:80	30	0	6:34	7:34	8:34	9:34	10:34	11:34	12:34	13:34	14:34	15:34	16:34	17:34			25.281725, 82.910749			
ROHANIA	2	18	4:80	30	0	6:38	7:38	8:38	9:38	10:38	11:38	12:38	13:38	14:38	15:38	16:38	17:38			25.289157, 82.927639			
BHULLANPUR	1	19	2:40	30	0	6:40	7:40	8:40	9:40	10:40	11:40	12:40	13:40	14:40	15:40	16:40	17:40			25.296004, 82.942333			
MODHAILA	1	20	2:40	35	0	6:42	7:42	8:42	9:42	10:42	11:42	12:42	13:42	14:42	15:42	16:42	17:42			25.300350, 82.949829			
CHANDPUR CHAURAH	1	21	2:40	35	0	6:44	7:44	8:44	9:44	10:44	11:44	12:44	13:44	14:44	15:44	16:44	17:44			25.305357, 82.953541			
BOULIA	2	23	4:80	35	0	6:48	7:48	8:48	9:48	10:48	11:48	12:48	13:48	14:48	15:48	16:48	17:48			25.315731, 82.964375			
LAHARTARA	1	24	2:40	35	0	6:50	7:50	8:50	9:50	10:50	11:50	12:50	13:50	14:50	15:50	16:50	17:50			25.316134, 82.968069			
CANTT RLY STATION	2	26	4:80	40	6	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00			25.326856, 82.988038			
NADESAR	2	28	4:80	40	0	7:04	8:04	9:04	10:04	11:04	12:04	13:04	14:04	15:04	16:04	17:04	18:04			25.332849, 82.989394			
KACHAHARI	1	29	2:40	40	0	7:06	8:06	9:06	10:06	11:06	12:06	13:06	14:06	15:06	16:06	17:06	18:06			25.342079, 82.980296			
CIRCUIT HOUSE	1	30	2:40	40	0	7:08	8:08	9:08	10:08	11:08	12:08	13:08	14:08	15:08	16:08	17:08	18:08			25.346452, 82.976760			
BHOUBEER	1	31	2:40	45	0	7:10	8:10	9:10	10:10	11:10	12:10	13:10	14:10	15:10	16:10	17:10	18:10			25.351253, 82.975320			
GILAT BAZAR	1	32	2:40	45	0	7:12	8:12	9:12	10:12	11:12	12:12	13:12	14:12	15:12	16:12	17:12	18:12			25.353975, 82.965737			
AGRASEN MOD	2	34	4:80	45	0	7:16	8:16	9:16	10:16	11:16	12:16	13:16	14:16	15:16	16:16	17:16	18:16			25.359381, 82.961490			
TARNA	1	35	2:40	45	0	7:18	8:18	9:18	10:18	11:18	12:18	13:18	14:18	15:18	16:18	17:18	18:18			25.362446, 82.939019			
B.H.E.L.	1	36	2:40	45	0	7:20	8:20	9:20	10:20	11:20	12:20	13:20	14:20	15:20	16:20	17:20	18:20			25.367355, 82.928917			
VYASBAGH	1	37	2:40	50	0	7:22	8:22	9:22	10:22	11:22	12:22	13:22	14:22	15:22	16:22	17:22	18:22			25.372259, 82.921516			
HARHUA	3	40	7:20	50	0	7:29	8:29	9:29	10:29	11:29	12:29	13:29	14:29	15:29	16:29	17:29	18:29			25.381284, 82.905533			
KAAZI SARAI	1	41	2:40	50	0	7:31	8:31	9:31	10:31	11:31	12:31	13:31	14:31	15:31	16:31	17:31	18:31			25.398689, 82.892036			
SATOMAHUA	2	43	4:80	55	0	7:35	8:35	9:35	10:35	11:35	12:35	13:35	14:35	15:35	16:35	17:35	18:35			25.411770, 82.884780			
RTO	1	44	2:40	55	0	7:37	8:37	9:37	10:37	11:37	12:37	13:37	14:37	15:37	16:37	17:37	18:37			25.423781, 82.873366			
SANMUKH HOSPITAL	2	46	4:80	55	0	7:41	8:41	9:41	10:41	11:41	12:41	13:41	14:41	15:41	16:41	17:41	18:41			25.430282, 82.861283			
AIRPORT ROAD	1	47	2:40	55	0	7:43	8:43	9:43	10:43	11:43	12:43	13:43	14:43	15:43	16:43	17:43	18:43			25.436178, 82.854178			
BABATPUR CHAURAH	2	49	4:80	60	0	7:47	8:47	9:47	10:47	11:47	12:47	13:47	14:47	15:47	16:47	17:47	18:47			25.448526, 82.847216			
Babatpur-Kachahari- Cantt-Chandpur-Mohansarai-Mirzamurad																							
Route NO. (E102)	KM	Total Km	Time	Fare	HLT	First Trip Bus-1	First Trip Bus-2	First Trip Bus-3	First Trip Bus 4	First Trip Bus-5	First Trip Bus 6	Second Trip Bus-1	Second Trip Bus-2	Second Trip Bus-3	Second Trip Bus-4	Second Trip Bus-5	Second Trip Bus-6						
						UP65LT 1393	UP32PN 6687	UP65KT 5046	UP32LT 1799	UP65LT 1398	UP32PN 8716	UP65LT 1393	UP32PN 6687	UP65KT 5046	UP32LT 1799	UP65LT 1398	UP32PN 8716						
BABATPUR CHAURAH	0	0	0:00	0	13	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00			25.448526, 82.847216			
AIRPORT ROAD	2	2	4:00	10	0	8:04	9:04	10:04	11:04	12:04	13:04	14:04	15:04	16:04	17:04	18:04	19:04			25.436152, 82.854317			
SANMUKH HOSPITAL	1	3	2:40	10	0	8:06	9:06	10:06	11:06	12:06	13:06	14:06	15:06	16:06	17:06	18:06	19:06			25.430080, 82.861047			
RTO	2	5	4:80	15	0	8:10	9:10	10:10	11:10	12:10	13:10	14:10	15:10	16:10	17:10	18:10	19:10			25.424209, 82.873184			
SATOMAHUA	1	6	2:40	15	0	8:12	9:12	10:12	11:12	12:12	13:12	14:12	15:12	16:12	17:12	18:12	19:12			25.411883, 82.885072			
KAAZI SARAI	2	8	4:80	20	0	8:16	9:16	10:16	11:16	12:16	13:16	14:16	15:16	16:16	17:16	18:16	19:16			25.398988, 82.892121			
HARHUA	1	9	2:40	20	0	8:18	9:18	10:18	11:18	12:18	13:18	14:18	15:18	16:18	17:18	18:18	19:18			25.381367, 82.905753			
VYASBAGH	3	12	7:20	25	0	8:25	9:25	10:25	11:25	12:25	13:25	14:25	15:25	16:25	17:25	18:25	19:25			25.372437, 82.921591			
B.H.E.L.	1	13	2:40	25	0	8:27	9:27	10:27	11:27	12:27	13:27	14:27	15:27	16:27	17:27	18:27	19:27			25.367641, 82.928782			
TARNA	1	14	2:40	25	0	8:29	9:29	10:29	11:29	12:29	13:29	14:29	15:29	16:29	17:29	18:29	19:29			25.362675, 82.939038			
AGRASEN MOD	1	15	2:40	30	0	8:31	9:31	10:31	11:31	12:31	13:31	14:31	15:31	16:31	17:31	18:31	19:31			25.359541, 82.961465			
GILAT BAZAR	2	17	4:80	30	0	8:35	9:35	10:35	11:35	12:35	13:35	14:35	15:35	16:35	17:35	18:35	19:35			25.354024, 82.965971			
BHOUBEER	1	18	2:40	30	0	8:37	9:37	10:37	11:37	12:37	13:37	14:37	15:37	16:37	17:37	18:37	19:37			25.351406, 82.975131			
CIRCUIT HOUSE	1	19	2:40	30	0	8:39	9:39	10:39	11:39	12:39	13:39	14:39	15:39	16:39	17:39	18:39	19:39			25.346475, 82.976838			
KACHAHARI	1	20	2:40	35	0	8:41	9:41	10:41	11:41	12:41	13:41	14:41	15:41	16:41	17:41	18:41	19:41			25.342208, 82.981180			
NADESAR	1	21	2:40	35	0	8:43	9:43	10:43	11:43	12:43	13:43	14:43	15:43	16:43	17:43	18:43	19:43			25.332815, 82.989755			
CANTT RLY STATION	2	23	4:80	35																			

Creating a DataFrame with Shapes

- Each table for each route sheet has its own shape from starting stop to last stop.
- The shape is not complete because we don't have linestring of geographical coordinates between two consecutive stops for each table
- Hence, I used MapBox Direction API to generate these coordinates

Mirzanagar-Mohamari-Chanderpur-Canti-Kachabari-Bahapur																			Latitude Longitude	
Route NO. (K302)	KM	Total Km	Time	Fare	H.L.T	First Trip	First Trip Bus-2	First Trip Bus-3	First Trip Bus-4	First Trip Bus-5	First Trip Bus-6	Second Trip	Second Trip Bus-2	Second Trip Bus-3	Second Trip Bus-4	Second Trip Bus-5	Second Trip Bus-6			
						UPOSLT 1000T	UPOSLT 1002N	UPOSLT 1006N	UPOSLT 1012T	UPOSLT 1006T	UPOSLT 1008N	UPOSLT 1009T	UPOSLT 1009N	UPOSLT 1010T	UPOSLT 1010N	UPOSLT 1011T	UPOSLT 1011N			
NIRJAMARA BETA BETA	3	3	3:00	0	0	8:00	7:58	8:00	8:02	8:04	8:06	8:08	8:10	8:12	8:14	8:16	8:18	25.284444, 82.780556		
MUGHAMARA BETA	1	1	4:00	10	0	8:02	7:52	8:02	8:02	8:02	8:02	8:02	8:02	8:02	8:02	8:02	8:02	25.285333, 82.776444		
BET	2	3	5:00	0	0	8:06	7:56	8:06	8:06	8:06	8:06	8:06	8:06	8:06	8:06	8:06	8:06	25.282443, 82.781422		
NAGRI BETA BETA	4	4	5:00	15	0	8:08	7:58	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	25.279555, 82.779444		
BANJANARA	2	6	6:00	15	0	8:12	7:52	8:12	8:12	8:12	8:12	8:12	8:12	8:12	8:12	8:12	8:12	25.275558, 82.821333		
BANJANARA	3	9	7:00	20	0	8:16	7:52	8:16	8:16	8:16	8:16	8:16	8:16	8:16	8:16	8:16	8:16	25.269444, 82.821333		
BANJANARA	4	12	8:00	25	0	8:20	7:52	8:20	8:20	8:20	8:20	8:20	8:20	8:20	8:20	8:20	8:20	25.274444, 82.821333		
SAHABARA	2	14	9:00	25	0	8:30	7:50	8:30	8:30	8:30	8:30	8:30	8:30	8:30	8:30	8:30	8:30	25.277555, 82.859444		
JAMATARA	2	16	9:00	30	0	8:34	7:34	8:34	8:34	8:34	8:34	8:34	8:34	8:34	8:34	8:34	8:34	25.281222, 82.850777		
ICHARA	2	18	9:00	30	0	8:38	7:34	8:38	8:38	8:38	8:38	8:38	8:38	8:38	8:38	8:38	8:38	25.289111, 82.827777		
BELE JAMAR	1	19	9:00	30	0	8:40	7:34	8:40	8:40	8:40	8:40	8:40	8:40	8:40	8:40	8:40	8:40	25.290666, 82.842222		
ICHARA	2	20	9:00	35	0	8:42	7:34	8:42	8:42	8:42	8:42	8:42	8:42	8:42	8:42	8:42	8:42	25.290333, 82.848888		
CHANDRUP CHAIRBARI	1	21	9:00	35	0	8:44	7:34	8:44	8:44	8:44	8:44	8:44	8:44	8:44	8:44	8:44	8:44	25.289888, 82.851111		
BELE JAMAR	2	23	9:00	35	0	8:48	7:34	8:48	8:48	8:48	8:48	8:48	8:48	8:48	8:48	8:48	8:48	25.315777, 82.854333		
JAMATARA	2	24	9:00	35	0	8:50	7:50	8:50	8:50	8:50	8:50	8:50	8:50	8:50	8:50	8:50	8:50	25.316222, 82.860000		
CANTI BETA STATION	3	26	9:00	40	0	7:00	7:00	9:00	9:00	9:00	9:00	9:00	9:00	9:00	9:00	9:00	9:00	25.328555, 82.888888		
NAGARA	3	28	9:00	40	0	7:04	8:04	9:04	9:04	9:04	9:04	9:04	9:04	9:04	9:04	9:04	9:04	25.332444, 82.889333		
KACHABARI	2	29	9:00	40	0	7:06	8:06	9:06	9:06	9:06	9:06	9:06	9:06	9:06	9:06	9:06	9:06	25.342222, 82.889333		
CHANDRUP CHAIRBARI	2	30	9:00	40	0	7:08	8:08	9:08	9:08	9:08	9:08	9:08	9:08	9:08	9:08	9:08	9:08	25.348444, 82.876666		
BELE JAMAR	1	31	9:00	45	0	7:10	8:10	9:10	9:10	9:10	9:10	9:10	9:10	9:10	9:10	9:10	9:10	25.351253, 82.875320		
KILAT BANGAR	1	32	9:00	45	0	7:12	8:12	9:12	9:12	9:12	9:12	9:12	9:12	9:12	9:12	9:12	9:12	25.353075, 82.866573		
ACHARAN BARI	2	34	9:00	45	0	7:16	8:16	9:16	9:16	9:16	9:16	9:16	9:16	9:16	9:16	9:16	9:16	25.369181, 82.861490		
TARANA	1	36	9:00	45	0	7:18	8:18	9:18	9:18	9:18	9:18	9:18	9:18	9:18	9:18	9:18	9:18	25.368444, 82.839555		
B.E.L.E.	2	38	9:00	45	0	7:20	8:20	9:20	9:20	9:20	9:20	9:20	9:20	9:20	9:20	9:20	9:20	25.367355, 82.828111		
NYABARCHI	1	37	9:00	50	0	7:22	8:22	9:22	9:22	9:22	9:22	9:22	9:22	9:22	9:22	9:22	9:22	25.372258, 82.825114		
BARUA	1	40	9:00	50	0	7:24	8:24	9:24	9:24	9:24	9:24	9:24	9:24	9:24	9:24	9:24	9:24	25.381284, 82.805553		
BAZAR SARAI	1	41	9:00	50	0	7:31	8:31	9:31	9:31	9:31	9:31	9:31	9:31	9:31	9:31	9:31	9:31	25.390600, 82.802000		
NATAMARIYA	1	43	9:00	55	0	7:35	8:35	9:35	9:35	9:35	9:35	9:35	9:35	9:35	9:35	9:35	9:35	25.415777, 82.884780		
BELE	4	44	9:00	55	0	7:37	8:37	9:37	9:37	9:37	9:37	9:37	9:37	9:37	9:37	9:37	9:37	25.423781, 82.873366		
KACHABARI BROAD	2	45	9:00	55	0	7:41	8:41	9:41	9:41	9:41	9:41	9:41	9:41	9:41	9:41	9:41	9:41	25.436833, 82.865177		
AIRPORT ROAD	1	47	9:00	55	0	7:43	8:43	9:43	9:43	9:43	9:43	9:43	9:43	9:43	9:43	9:43	9:43	25.435178, 82.854519		
BAHAPUR CHAIRBARI	2	49	9:00	60	0	7:47	8:47	9:47	9:47	9:47	9:47	9:47	9:47	9:47	9:47	9:47	9:47	25.448526, 82.847216		
Bahapur-Kachabari-Canti-Chanderpur-Mohamari-Mirzanagar																				
Route NO. (K302)	KM	Total Km	Time	Fare	H.L.T	First Trip	First Trip Bus-2	First Trip Bus-3	First Trip Bus-4	First Trip Bus-5	First Trip Bus-6	Second Trip	Second Trip Bus-2	Second Trip Bus-3	Second Trip Bus-4	Second Trip Bus-5	Second Trip Bus-6			
						UPOSLT 1002T	UPOSLT 1002N	UPOSLT 1006N	UPOSLT 1012T	UPOSLT 1006T	UPOSLT 1008N	UPOSLT 1009T	UPOSLT 1009N	UPOSLT 1010T	UPOSLT 1010N	UPOSLT 1011T	UPOSLT 1011N			
BEALPATE BETA BETA	3	3	3:00	0	0	8:00	7:58	8:00	8:00	8:00	8:00	8:00	8:00	8:00	8:00	8:00	8:00	25.448526, 82.847216		
BEALPATE BETA	2	3	3:00	10	0	8:02	7:52	8:02	8:02	8:02	8:02	8:02	8:02	8:02	8:02	8:02	8:02	25.435122, 82.854111		
CHANDRUP CHAIRBARI	1	3	4:00	10	0	8:06	7:56	8:06	8:06	8:06	8:06	8:06	8:06	8:06	8:06	8:06	8:06	25.430600, 82.861444		
BELE	2	6	5:00	15	0	8:05	7:54	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	25.424200, 82.873188		
CHANDRUP CHAIRBARI	1	6	6:00	15	0	8:04	7:54	8:04	8:04	8:04	8:04	8:04	8:04	8:04	8:04	8:04	8:04	25.424666, 82.865177		
BELE JAMAR	2	9	7:00	20	0	8:04	7:54	8:04	8:04	8:04	8:04	8:04	8:04	8:04	8:04	8:04	8:04	25.398888, 82.893213		
BELE JAMAR	3	9	7:00	20	0	8:08	7:58	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	25.381367, 82.905755		
NYABARCHI	1	12	7:30	25	0	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	25.374337, 82.921891		
B.E.L.E.	1	13	7:30	25	0	8:07	8:07	8:07	8:07	8:07	8:07	8:07	8:07	8:07	8:07	8:07	8:07	25.367441, 82.928783		
TARANA	1	14	7:30	25	0	8:09	8:09	8:09	8:09	8:09	8:09	8:09	8:09	8:09	8:09	8:09	8:09	25.362475, 82.939555		
ACHARAN BARI	2	16	7:30	30	0	8:11	8:11	8:11	8:11	8:11	8:11	8:11	8:11	8:11	8:11	8:11	8:11	25.359441, 82.951444		
KILAT BANGAR	2	17	7:30	30	0	8:11	8:11	8:11	8:11	8:11	8:11	8:11	8:11	8:11	8:11	8:11	8:11	25.350224, 82.955777		
BELE JAMAR	1	18	7:30	30	0	8:12	8:12	8:12	8:12	8:12	8:12	8:12	8:12	8:12	8:12	8:12	8:12	25.351400, 82.975313		
CHANDRUP CHAIRBARI	1	19	7:30	35	0	8:12	8:12	8:12	8:12	8:12	8:12	8:12	8:12	8:12	8:12	8:12	8:12	25.346475, 82.976833		
NATAMARIYA	1	20	7:30	35	0	8:14	8:14	8:14	8:14	8:14	8:14	8:14	8:14	8:14	8:14	8:14	8:14	25.342208, 82.981180		
NAGARA	2	21	7:30	35	0	8:15	8:15	8:15	8:15	8:15	8:15	8:15	8:15	8:15	8:15	8:15	8:15	25.342815, 82.988750		
CANTI BETA STATION	3	23	8:00	35	0	8:02	9:02	8:02	8:02	8:02	8:02	8:02	8:02	8:02	8:02	8:02	8:02	25.324556, 82.988444		
BAHAPUR CHAIRBARI	2	25	8:00	40	0	8:05	9:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	25.316623, 82.988195		
BELE JAMAR	1	26	7:00	40	0	8:08	9:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	25.310463, 82.984456		
CHANDRUP CHAIRBARI	2	28	8:00	40	0	8:02	9:02	8:02	8:02	8:02	8:02	8:02	8:02	8:02	8:02	8:02	8:02	25.305132, 82.953530		
NIRJAMARA	1	29	7:00	40	0	8:06	9:06	8:06	8:06	8:06	8:06	8:06	8:06	8:06	8:06	8:06	8:06	25.300350, 82.949822		
BELE JAMAR	1	30	7:00	40	0	8:05	9:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	25.296064, 82.942133		
ICHARA	1	31	7:00	45	0	8:08	9:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	25.289550, 82.927672		
JAMATARA	2	33	8:00	45	0	8:12	9:12	8:12	8:12	8:12	8:12	8:12	8:12	8:12	8:12	8:12	8:12	25.281460, 82.910700		
SAHABARA	2	35	8:00	45	0	8:05	9:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	8:05	25.277760, 82.877855		
NATAMARIYA	1	36	7:00	50	0	8:07	9:07	8:07	8:07	8:07	8:07	8:07	8:07	8:07	8:07	8:07	8:07	25.274152, 82.871855		
KILAT BANGAR	2	38	7:00	50	0	8:07	9:07	8:07	8:07	8:07	8:07	8:07	8:07	8:07	8:07	8:07	8:07	25.269667, 82.864402		
BELE JAMAR	3	41	7:00	55	0	8:08	9:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	25.271347, 82.821820		
NAGRI BETA BETA	2	46	6:00	55	0	8:08	9:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	8:08	25.279512, 82.799522		
BELE	1	46	6:00	55	0	8:50	9:50	8:50	8:50	8:50	8:50	8:50	8:50	8:50	8:50					

Shape 1

Shape 2

Shapes.txt features

- Features:
 - shape_id: shape of the route
 - shape_pt_lat: Latitude of a point visited in the trip
 - shape_pt_lon: longitude of a point visited in the trip
 - shape_pt_sequence: Sequence number of the point in the shape

```
shapes=pd.DataFrame(columns=['shape_id','shape_pt_lat','shape_pt_lon','shape_pt_sequence'])
```

Overall Code

- Iterates over all route sheets and then creates temporary shape data frames for each subtables
- Each temporary shape data frames is appended into main shapes data frame

```
#Reads through all excel sheets and extract all shapes
shapes=pd.DataFrame(columns=['shape_id','shape_pt_lat','shape_pt_lon','shape_pt_sequence'])
shape_id=0
for route in dfSuperSet.keys():
    #skips the first sheet of excel file
    if route=='50 Bus KM (2)':
        pass
    else:
        c=pd.DataFrame(dfSuperSet[route]).iloc[1:].dropna(axis=1,how='all')
        c=c.rename(columns={c.columns[0]:'stop_name'})
        #gets the column name for coordinates
        latlon=[col for col in c.columns if 'Latitude' in col][0]

        #Keeps track of null rows between subtables
        index_list=c[c.isnull().all(axis=1)].index
        if route=='Mirzamurad-Chubpur-MARKAND 106':
            index_list=index_list[13]

        #iterates through each table of the sheet
        for i in range(len(index_list)):
            #checks the first table of the sheet
            if index_list[i]==index_list[0]:
                temp=c.iloc[1:index_list[i]]
                temp['next_stop_coord']=temp[latlon].shift(-1)
                temp['next_stop']=temp['stop_name'].shift(-1)
                temp=temp[temp['next_stop_coord'].notnull()]

                shape_point_sequence=0
                #creates a temporary table for one shape
                temp_shapes=pd.DataFrame(columns=['shape_id','shape_pt_lat','shape_pt_lon','shape_pt_sequence'])
                #iterates through all stops visited in one shape and provides list of points between them
                for k,v in temp.iterrows():
                    #Get coordinates for the origin and destination stops
                    stop_coord = [float(n) for n in v[latlon].split(",")]
                    next_stop_coord=[float(n) for n in v['next_stop_coord'].split(",")]

                    shape_list_of_geometry = shape(stop_coord, next_stop_coord)
                    temp_shapes.append({'shape_pt_lat':shape_list_of_geometry}, ignore_index=True)

                #create rows for each geographical coordinate visited between stops
                temp_shapes=temp_shapes.explode('shape_pt_lat').reset_index(drop=True)
                temp_shapes[['shape_pt_lon','shape_pt_lat']]=pd.DataFrame(temp_shapes['shape_pt_lat'].tolist(), index= temp_shapes.index)

                temp_shapes['shape_id']=shape_id
                temp_shapes['shape_pt_sequence']=temp_shapes.index
                #appends this table into main shape table
                shapes=shapes.append(temp_shapes).reset_index(drop=True)
                shape_id+=1

            #skips consecutive empty lines
            elif c.iloc[index_list[i-1]+1:index_list[i]].empty:
                pass
            else:
                #checks the later tables of the sheet
                temp=c.iloc[index_list[i-1]+4:index_list[i]].reset_index(drop=True)
                #works same as first table
                temp['next_stop_coord']=temp[latlon].shift(-1)
                temp['next_stop']=temp['stop_name'].shift(-1)
                temp=temp[temp['next_stop_coord'].notnull()]

                shape_point_sequence=0
                temp_shapes=pd.DataFrame(columns=['shape_id','shape_pt_lat','shape_pt_lon','shape_pt_sequence'])
                for k,v in temp.iterrows():
                    stop_coord = [float(n) for n in v[latlon].split(",")]
                    next_stop_coord=[float(n) for n in v['next_stop_coord'].split(",")]

                    shape_list_of_geometry = shape(stop_coord, next_stop_coord)
                    temp_shapes.append({'shape_pt_lat':shape_list_of_geometry}, ignore_index=True)

                temp_shapes=temp_shapes.explode('shape_pt_lat').reset_index(drop=True)
                temp_shapes[['shape_pt_lon','shape_pt_lat']]=pd.DataFrame(temp_shapes['shape_pt_lat'].tolist(), index= temp_shapes.index)
                temp_shapes['shape_id']=shape_id
                temp_shapes['shape_pt_sequence']=temp_shapes.index
                shapes=shapes.append(temp_shapes).reset_index(drop=True)
                shape_id+=1
```

Code Snippets for creating a Data Frame with Shapes

- This code snippet converts an excel sheet containing information of one route into a pandas data frame. index_list stores indices where the rows are null (separating two subtables)
- DfSuperSet stores all excel sheets of all routes

```
c=pd.DataFrame(dfSuperSet[route]).iloc[: -1].dropna(axis=1,how='all')
c=c.rename(columns={c.columns[0]: 'stop_name'})
#gets the column name for coordinates
latlon=[col for col in c.columns if 'Latitude' in col][0]

#Keeps track of null rows between subtables
index_list=c[c.isnull().all(axis=1)].index
if route=='Mirzamurad-Chubpur-MARKAND 106':|
    index_list=index_list[:3]
```


Code Snippets for creating a Data Frame with Shapes

- This function takes the coordinates of two consecutive stops of a shape and generates a list of geographical coordinates it will visit in between the two stops

```
#Generates a list of geographical coordinates representing linestring from origin stop to destination stop
def shape(stop_coord,next_stop_coord):
    x = requests.get("https://api.mapbox.com/directions/v5/mapbox/driving/"+str(stop_coord[1])+"%2C"+str(stop_coord[0])+"\
    \"%3B\"+str(next_stop_coord[1])+"%2C"+str(next_stop_coord[0])+"\
    "?alternatives=true&geometries=geojson&language=en&overview=simplified&steps=true&access_token=pk.eyJ1IjoienVscWFyYSIsImEiOiJJjbGVkNWxmMDMwMzN1M3lzMmF6bGkzMm9z"
    return x.json()['routes'][0]['geometry']['coordinates']
```

Code Snippets for creating a Data Frame with Shapes

- This code snippet iterates through each table and call shape function for each consecutive stops. It then stores all the geographical coordinates between stops as rows and append it to main shapes data frame

```
#creates a temporary table for one shape
temp_shapes=pd.DataFrame(columns=['shape_id','shape_pt_lat','shape_pt_lon','shape_pt_sequence'])
#iterates through all stops visited in one shape and provides list of points between them
for k,v in temp.iterrows():
    #Get coordinates for the origin and destination stops
    stop_coord = [float(n) for n in v[latlon].split(",")]
    next_stop_coord=[float(n) for n in v['next_stop_coord'].split(",")]

    shape_list_of_geometry = shape(stop_coord, next_stop_coord)
    temp_shapes=temp_shapes.append({'shape_pt_lat':shape_list_of_geometry}, ignore_index=True)

#create rows for each geographical coordinate visited between stops
temp_shapes=temp_shapes.explode('shape_pt_lat').reset_index(drop=True)
temp_shapes[['shape_pt_lon','shape_pt_lat']]=pd.DataFrame(temp_shapes['shape_pt_lat'].tolist(), index= temp_shapes.index)

temp_shapes['shape_id']=shape_id
temp_shapes['shape_pt_sequence']=temp_shapes.index
#appends this table into main shape table
shapes=shapes.append(temp_shapes).reset_index(drop=True)
shape_id+=1
```