Name and last name: ……

Exercise 3A. Impact of spatial development changes on trip generation

Please demonstrate how number of trips (from **exercise 2**) will change after assuming the following changes of functional structure of travel analysis zone (TAZ). Please select two scenarios from the list below:

1. Services development – new shopping center (retail space 15 000m^2),
2. Services – new office block (office space 30 000 m^2)
3. Residential development – (living space 20 000 m^2, forecast number of inhabitants 1 000 people),
4. Industrial development – new factory (industrial area 50 000 m^2),
5. Education – building of new university campus (area of education 20 000 m^2)
6. Transformation of function – conversion from industry (e.g. old magazines, railways, factories) into office space,
7. Transformation of function – conversion from industry (e.g. old magazines, railways, factories) into residential space (assume 1 inhabitant per each 20 m^2 of new residential space).

Selected scenarios of spatial development should be feasible within the examined travel analysis zone. Scenarios should also aim to provide a multifunctional, sustainable character of travel analysis zone – e.g. a high share of walking trips from homes to workplaces.

Scenario nr……

Purpose (m)	Production [trips/day]	Share [%]	Attraction [trips/day]	Share [%]
H-W				
W-H				
H-E				
E-H				
H-O				
O-H				
NHR				
TOTAL				

Scenario nr……

Purpose (m)	Production [trips/day]	Share [%]	Attraction [trips/day]	Share [%]
H-W				
W-H				
H-E				
E-H				
H-O				
O-H				
NHR				
TOTAL				

Report

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Exercise 3B. Temporal trip distribution, peak hour demand.

In **exercise 2** the daily trip generation were determined in each trip purpose. For transportation planning purposes, the most important is period with the highest number of trips, also known as peak hour period. Performance of urban transportation systems is analyzed for the morning and afternoon peak hours. Percentage share of hours in daily trips for each trip purpose is determined on the basis of Comprehensive Traffic Study results. The percentage shares of consecutive hours during a day were devised on the basis of Comprehensive Traffic Study in 2013 in Cracow and is shown in table 6.

Tab. 6 Distribution of trip purposes in a day

Hour		Trip purpose						
from	to	H-W	W-H	H-E	E-H	H-O	O-H	NHR
0	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2	3	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3	4	0.3%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%
4	5	3.5%	0.0%	0.1%	0.0%	0.3%	0.1%	0.1%
5	6	16.0%	0.2%	0.5%	0.0%	1.0%	0.1%	0.3%
6	7	28.7%	0.3%	12.3%	0.0%	3.9%	0.3%	1.3%
7	**8**	**28.2%**	**0.2%**	**26.0%**	**0.2%**	**8.6%**	**1.2%**	**5.8%**
8	9	9.5%	0.2%	22.6%	0.6%	10.1%	2.6%	5.3%
9	10	4.3%	0.3%	22.1%	0.3%	14.0%	3.6%	6.3%
10	11	1.9%	0.4%	8.0%	1.2%	10.9%	6.7%	9.3%
11	12	1.3%	1.2%	2.4%	4.7%	7.6%	8.7%	10.4%
12	13	1.4%	1.9%	1.8%	11.0%	4.9%	9.1%	8.3%
13	14	1.4%	5.8%	1.0%	22.4%	4.9%	7.8%	9.9%
14	15	0.9%	17.6%	0.6%	27.5%	4.6%	7.6%	10.6%
15	**16**	**0.5%**	**26.8%**	**0.4%**	**14.3%**	**5.8%**	**7.8%**	**11.7%**
16	17	0.5%	18.8%	1.2%	8.3%	7.5%	9.1%	7.6%
17	18	0.7%	10.7%	0.8%	4.0%	7.1%	8.4%	5.1%
18	19	0.3%	5.7%	0.3%	2.8%	4.3%	8.0%	3.6%
19	20	0.1%	3.8%	0.1%	2.0%	2.6%	8.2%	2.3%
20	21	0.2%	2.4%	0.0%	0.3%	1.1%	5.5%	1.2%
21	22	0.2%	2.3%	0.0%	0.3%	0.4%	3.3%	0.5%
22	23	0.0%	1.2%	0.0%	0.1%	0.1%	1.4%	0.2%
23	24	0.0%	0.2%	0.0%	0.0%	0.0%	0.6%	0.1%

In this exercise please do and shortly describe the following:

a) for each trip purpose indicate the (hour) period with the highest number of trips,
b) calculate the sums of started (production) and ended trips (attraction) in each hour for a given TAZ,
c) give the number of trips started and ended in the morning and afternoon peak hour,
d) describe the character of traffic analysis zone:
   - if there are two peak periods or a single (clear) peak hour- if so, which one? (morning, afternoon),
   - how much does the trip generation decrease in the lowest period between morning and afternoon peak hour (i.e. the midday off-peak period) – compared to trip generation in the peak hour?
   - how much will morning peak hour trip volume change during summer holiday (when there are no trips made in educational purposes (H-E, E-H))?