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HOMEWORK WEEK 8 (Solution)

1. How are the strata defined in pure choice-based sampling?

**Solution:** Pure choice-based sample is the case where each choice in the choice set corresponds to a separate stratum. For this exercise, the three strata are car, bus and slow modes.

2. Consider the population described in Table 1. Characterize a sample with the following sampling probabilities:

**Solution:**

- $R(\text{Car}) = \frac{1}{1000}$
- $R(\text{Bus}) = \frac{1}{500}$
- $R(\text{Slow Modes}) = \frac{1}{1000}$

Mode	Age			
	Young	Adult	Retired	
Car	10'000	120'000	15'000	145'000
Bus	15'000	30'000	25'000	70'000
Slow mode	25'000	50'000	10'000	85'000
	50'000	200'000	50'000	300'000

Table 1: Description of the population of the city

Mode	Age			
	Young	Adult	Retired	
Car	10	120	15	145
Bus	30	60	50	140
Slow mode	25	50	10	85
	65	230	75	370

Table 2: Description of the sample with the given sampling probabilities

3. Which estimation procedures are used for the following models with this sampling strategy?  
How are they used?

**Solution:**

- **Logit model:** ESML and correct the constants
- **MEV model:** requires to estimate the bias from data, it is implemented on Biogeme

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