**CE 45000: Transport Policy and Planning**

**Due Thursday, November 12, 2019**

**Problem 1:** Using the data provided in the Table 1, develop a model to estimate work trips and shopping trips?

**Table 1: Survey Results for 20 Households**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Household | Income | Cars | Size | Workers | Work trips | Shopping trips |
| 1 | 61,000 | 3 | 1 | 1 | 1.1 | 0.9 |
| 2 | 36,000 | 1 | 6 | 5 | 4.2 | 2.3 |
| 3 | 75,000 | 2 | 5 | 1 | 0.3 | 2.9 |
| 4 | 60,000 | 3 | 4 | 1 | 1 | 2.4 |
| 5 | 54,000 | 1 | 5 | 3 | 2.4 | 2.1 |
| 6 | 30,000 | 1 | 1 | 1 | 0.6 | 0.1 |
| 7 | 62,000 | 1 | 5 | 2 | 1.9 | 1.6 |
| 8 | 44,000 | 1 | 5 | 4 | 3.2 | 1.7 |
| 9 | 44,000 | 0 | 4 | 3 | 2.9 | 1.2 |
| 10 | 54,000 | 2 | 1 | 1 | 0.9 | 1.5 |
| 11 | 39,000 | 1 | 2 | 1 | 0.6 | 0.9 |
| 12 | 55,000 | 3 | 6 | 3 | 2.1 | 2.1 |
| 13 | 35,000 | 1 | 6 | 2 | 1.8 | 1.6 |
| 14 | 71,000 | 1 | 2 | 1 | 0.8 | 1.5 |
| 15 | 40,000 | 2 | 4 | 2 | 2.2 | 1.3 |
| 16 | 58,000 | 2 | 3 | 2 | 1.3 | 1.2 |
| 17 | 48,000 | 1 | 5 | 4 | 3.2 | 1.9 |
| 18 | 45,000 | 0 | 3 | 1 | 1 | 1 |
| 19 | 48,000 | 2 | 1 | 1 | 0.7 | 1.1 |
| 20 | 55,000 | 2 | 3 | 1 | 0.5 | 2 |

**Problem 2:** Using the models developed in Problem 1,estimate total work and shopping trips for four zones using census data from table 2.

**Table 2: Socioeconomic and Employment Data from the US Census**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Zone | Households | Income | Cars | Size | Workers | Office space (ft2) | Retail space (ft2) |
| 1 | 23,000 | 30,000 | 1.4 | 2.1 | 1.4 | 2.00E+06 | 5.00E+06 |
| 2 | 35,000 | 25,000 | 1.8 | 2.2 | 1.6 | 3.00E+06 | 1.50E+07 |
| 3 | 85,000 | 55,000 | 2.5 | 2.3 | 1.5 | 1.00E+07 | 1.00E+07 |
| 4 | 15,000 | 85,000 | 1.1 | 1.5 | 1.3 | 2.50E+07 | 2.00E+07 |

**Problem 3:** Using the following zone attractions models, estimate zone attractions for four zones.

Zone attraction model for work trips: $Work Trips=2,500+\frac{AnnualIncome}{3000}+\frac{OfficeSpace (ft^{2})}{250}$

Zone attraction model for shopping trips: $Shopping Trips=-3,500+\frac{AnnualIncome}{100}+\frac{RetailSpace (ft^{2})}{250}$

**Problem 4:** Balance the zone attractions matrix considering as zone productions as a control?