## NMIMS Global Access

## School for Continuing Education (NGA-SCE)

**Course: Decision Science**

## Internal Assignment Applicable for September 2020 Examination

## Question 1

The data set given in Table 1 is having variables namely, house price of unit area (Y), house age (X1), distance to nearest MRT station (X2), number of convenience stores (X3), latitude (X4), and longitude (X5).

Table 1: Data Set

**Table Below**

**Internal Assignment Applicable for September 2020 Examination**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| S.No. | X1 | X2 | X3 | X4 | X5 | Y |
| 1 | 6.4 | 90.45606 | 9 | 24.97433 | 121.5431 | 62.2 |
| 2 | 17.5 | 964.7496 | 4 | 24.98872 | 121.53411 | 38.2 |
| 3 | 12.7 | 170.1289 | 1 | 24.97371 | 121.52984 | 32.9 |
| 4 | 1.1 | 193.5845 | 6 | 24.96571 | 121.54089 | 54.4 |
| 5 | 0 | 208.3905 | 6 | 24.95618 | 121.53844 | 45.7 |
| 6 | 32.7 | 392.4459 | 6 | 24.96398 | 121.5425 | 30.5 |
| 7 | 0 | 292.9978 | 6 | 24.97744 | 121.54458 | 71 |
| 8 | 17.2 | 189.5181 | 8 | 24.97707 | 121.54308 | 47.1 |
| 9 | 12.2 | 1360.139 | 1 | 24.95204 | 121.54842 | 26.6 |
| 10 | 31.4 | 592.5006 | 2 | 24.9726 | 121.53561 | 34.1 |
| 11 | 4 | 2147.376 | 3 | 24.96299 | 121.51284 | 28.4 |
| 12 | 8.1 | 104.8101 | 5 | 24.96674 | 121.54067 | 51.6 |
| 13 | 33.3 | 196.6172 | 7 | 24.97701 | 121.54224 | 39.4 |
| 14 | 9.9 | 2102.427 | 3 | 24.96044 | 121.51462 | 23.1 |
| 15 | 14.8 | 393.2606 | 6 | 24.96172 | 121.53812 | 7.6 |
| 16 | 30.6 | 143.8383 | 8 | 24.98155 | 121.54142 | 53.3 |
| 17 | 20.6 | 737.9161 | 2 | 24.98092 | 121.54739 | 46.4 |
| 18 | 30.9 | 6396.283 | 1 | 24.94375 | 121.47883 | 12.2 |
| 19 | 13.6 | 4197.349 | 0 | 24.93885 | 121.50383 | 13 |
| 20 | 25.3 | 1583.722 | 3 | 24.96622 | 121.51709 | 30.6 |
| 21 | 16.6 | 289.3248 | 5 | 24.98203 | 121.54348 | 59.6 |
| 22 | 13.3 | 492.2313 | 5 | 24.96515 | 121.53737 | 31.3 |
| 23 | 13.6 | 492.2313 | 5 | 24.96515 | 121.53737 | 48 |
| 24 | 31.5 | 414.9476 | 4 | 24.98199 | 121.54464 | 32.5 |
| 25 | 0 | 185.4296 | 0 | 24.9711 | 121.5317 | 45.5 |
| 26 | 9.9 | 279.1726 | 7 | 24.97528 | 121.54541 | 57.4 |
| 27 | 1.1 | 193.5845 | 6 | 24.96571 | 121.54089 | 48.6 |
| 28 | 38.6 | 804.6897 | 4 | 24.97838 | 121.53477 | 62.9 |
| 29 | 3.8 | 383.8624 | 5 | 24.98085 | 121.54391 | 55 |
| 30 | 41.3 | 124.9912 | 6 | 24.96674 | 121.54039 | 60.7 |
| 31 | 38.5 | 216.8329 | 7 | 24.98086 | 121.54162 | 41 |
| 32 | 29.6 | 535.527 | 8 | 24.98092 | 121.53653 | 37.5 |
| 33 | 4 | 2147.376 | 3 | 24.96299 | 121.51284 | 30.7 |
| 34 | 26.6 | 482.7581 | 5 | 24.97433 | 121.53863 | 37.5 |
| 35 | 18 | 373.3937 | 8 | 24.9866 | 121.54082 | 39.5 |
| 36 | 33.4 | 186.9686 | 6 | 24.96604 | 121.54211 | 42.2 |
| 37 | 18.9 | 1009.235 | 0 | 24.96357 | 121.54951 | 20.8 |

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|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 38 | 11.4 | 390.5684 | 5 | 24.97937 | 121.54245 | 46.8 |
| 39 | 13.6 | 319.0708 | 6 | 24.96495 | 121.54277 | 47.4 |
| 40 | 10 | 942.4664 | 0 | 24.97843 | 121.52406 | 43.5 |
| 41 | 12.9 | 492.2313 | 5 | 24.96515 | 121.53737 | 42.5 |
| 42 | 16.2 | 289.3248 | 5 | 24.98203 | 121.54348 | 51.4 |
| 43 | 5.1 | 1559.827 | 3 | 24.97213 | 121.51627 | 28.9 |
| 44 | 19.8 | 640.6071 | 5 | 24.97017 | 121.54647 | 37.5 |
| 45 | 13.6 | 492.2313 | 5 | 24.96515 | 121.53737 | 40.1 |
| 46 | 11.9 | 1360.139 | 1 | 24.95204 | 121.54842 | 28.4 |
| 47 | 2.1 | 451.2438 | 5 | 24.97563 | 121.54694 | 45.5 |
| 48 | 0 | 185.4296 | 0 | 24.9711 | 121.5317 | 52.2 |
| 49 | 3.2 | 489.8821 | 8 | 24.97017 | 121.54494 | 43.2 |
| 50 | 16.4 | 3780.59 | 0 | 24.93293 | 121.51203 | 45.1 |
| 51 | 34.9 | 179.4538 | 8 | 24.97349 | 121.54245 | 39.7 |
| 52 | 35.8 | 170.7311 | 7 | 24.96719 | 121.54269 | 48.5 |
| 53 | 4.9 | 387.7721 | 9 | 24.98118 | 121.53788 | 44.7 |
| 54 | 12 | 1360.139 | 1 | 24.95204 | 121.54842 | 28.9 |
| 55 | 6.5 | 376.1709 | 6 | 24.95418 | 121.53713 | 40.9 |
| 56 | 16.9 | 4066.587 | 0 | 24.94297 | 121.50342 | 20.7 |
| 57 | 13.8 | 4082.015 | 0 | 24.94155 | 121.50381 | 15.6 |
| 58 | 30.7 | 1264.73 | 0 | 24.94883 | 121.52954 | 18.3 |
| 59 | 16.1 | 815.9314 | 4 | 24.97886 | 121.53464 | 35.6 |
| 60 | 11.6 | 390.5684 | 5 | 24.97937 | 121.54245 | 39.4 |
| 61 | 15.5 | 815.9314 | 4 | 24.97886 | 121.53464 | 37.4 |
| 62 | 3.5 | 49.66105 | 8 | 24.95836 | 121.53756 | 57.8 |
| 63 | 19.2 | 616.4004 | 3 | 24.97723 | 121.53767 | 39.6 |
| 64 | 16 | 4066.587 | 0 | 24.94297 | 121.50342 | 11.6 |
| 65 | 8.5 | 104.8101 | 5 | 24.96674 | 121.54067 | 55.5 |
| 66 | 0 | 185.4296 | 0 | 24.9711 | 121.5317 | 55.2 |
| 67 | 13.7 | 1236.564 | 1 | 24.97694 | 121.55391 | 30.6 |
| 68 | 0 | 292.9978 | 6 | 24.97744 | 121.54458 | 73.6 |
| 69 | 28.2 | 330.0854 | 8 | 24.97408 | 121.54011 | 43.4 |
| 70 | 27.6 | 515.1122 | 5 | 24.96299 | 121.5432 | 37.4 |
| 71 | 8.4 | 1962.628 | 1 | 24.95468 | 121.55481 | 23.5 |
| 72 | 24 | 4527.687 | 0 | 24.94741 | 121.49628 | 14.4 |
| 73 | 3.6 | 383.8624 | 5 | 24.98085 | 121.54391 | 58.8 |
| 74 | 6.6 | 90.45606 | 9 | 24.97433 | 121.5431 | 58.1 |
| 75 | 41.3 | 401.8807 | 4 | 24.98326 | 121.5446 | 35.1 |
| 76 | 4.3 | 432.0385 | 7 | 24.9805 | 121.53778 | 45.2 |
| 77 | 30.2 | 472.1745 | 3 | 24.97005 | 121.53758 | 36.5 |

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|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 78 | 13.9 | 4573.779 | 0 | 24.94867 | 121.49507 | 19.2 |
| 79 | 33 | 181.0766 | 9 | 24.97697 | 121.54262 | 42 |
| 80 | 13.1 | 1144.436 | 4 | 24.99176 | 121.53456 | 36.7 |
| 81 | 14 | 438.8513 | 1 | 24.97493 | 121.5273 | 42.6 |
| 82 | 26.9 | 4449.27 | 0 | 24.94898 | 121.49621 | 15.5 |
| 83 | 11.6 | 201.8939 | 8 | 24.98489 | 121.54121 | 55.9 |
| 84 | 13.5 | 2147.376 | 3 | 24.96299 | 121.51284 | 23.6 |
| 85 | 17 | 4082.015 | 0 | 24.94155 | 121.50381 | 18.8 |
| 86 | 14.1 | 2615.465 | 0 | 24.95495 | 121.56174 | 21.8 |
| 87 | 31.4 | 1447.286 | 3 | 24.97285 | 121.5173 | 21.5 |
| 88 | 20.9 | 2185.128 | 3 | 24.96322 | 121.51237 | 25.7 |
| 89 | 8.9 | 3078.176 | 0 | 24.95464 | 121.56627 | 22 |
| 90 | 34.8 | 190.0392 | 8 | 24.97707 | 121.54312 | 44.3 |
| 91 | 16.3 | 4066.587 | 0 | 24.94297 | 121.50342 | 20.5 |
| 92 | 35.3 | 616.5735 | 8 | 24.97945 | 121.53642 | 42.3 |
| 93 | 13.2 | 750.0704 | 2 | 24.97371 | 121.54951 | 37.8 |
| 94 | 43.8 | 57.58945 | 7 | 24.9675 | 121.54069 | 42.7 |
| 95 | 9.7 | 421.479 | 5 | 24.98246 | 121.54477 | 49.3 |
| 96 | 15.2 | 3771.895 | 0 | 24.93363 | 121.51158 | 29.3 |
| 97 | 15.2 | 461.1016 | 5 | 24.95425 | 121.5399 | 34.6 |
| 98 | 22.8 | 707.9067 | 2 | 24.981 | 121.54713 | 36.6 |
| 99 | 34.4 | 126.7286 | 8 | 24.96881 | 121.54089 | 48.2 |
| 100 | 34 | 157.6052 | 7 | 24.96628 | 121.54196 | 39.1 |

## Understanding and usage of the formula and calculation

On the basis of data given in Table 1,

1. Compute the descriptive statistics using the box plot and comment upon the 5 point

**Question 2**

**On the basis of data given in Table 1,**

1. **Draw the scatter plot of Y with each Xi (i = 1, 2, 3, 4, 5)**

**b. Find the correlation of Y with each Xi. Also check the significance of correlation coefficient at 5% level of significance for each.**

**c. Using multiple regression, find the linear regression equation predicting Y on basis of Xi’s (i = 1, 2, 3, 4, 5) and comment upon R square and adjusted R square value.**

**d. If regression is showing any insignificant variable/s (subpart c), drop the variable/s from the regression equation and run the regression again. Now compare the R square and adjusted R square with the previous model and comment on the same.**

## Understanding and usage of the formula and calculation

On the basis of data given in Table 1,

a.Draw the scatter plot of Y with each Xi (i = 1, 2, 3, 4, 5)

## Question 3

**3. Team leader Mr. X claims that the average output of his team is 900 pages per day. To check his claim 50 employees are selected at random and the average output is found at 854 pages with the standard deviation of 42 pages.**

**a. Construct the null hypothesis and alternate hypothesis for the given problem.**

**(5 Marks)**

**b. Is the claim of Mr. X true at 5% level of significance? Construct 95% confidence interval for the sample mean.**

## Understanding the concept and application and the calculation

Team leader Mr. X claims that the average output of his team is 900 pages per day. To check his claim 50 employees are selected at random and the average output is found at 854 pages with the standard deviation of 42 pages.

1. Construct the null hypothesis and alternative hypothesis for the given problem.

H0 = Mean = 900