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     " 1    Gender                  200 non-null    object\n",
     " 2    Age                     200 non-null    int64 \n",
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 "count                   200.000000    \n",
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```
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```
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```

```
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"            <td>0.096154</td>\n",
"            <td>0.008493</td>\n",
"            <td>0.775510</td>\n",
```

```
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"            <td>0.0</td>\n",
"            <td>0.250000</td>\n",
"            <td>0.016985</td>\n",
"            <td>0.397959</td>\n",
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"</table>\n",
"</div>"
],
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"1       1.0  0.057692  0.000000  0.816327\n",
"2       0.0  0.038462  0.008493  0.051020\n",
"3       0.0  0.096154  0.008493  0.775510\n",
"4       0.0  0.250000  0.016985  0.397959"
]
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}
```

```
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    "data1.head()"
  ]
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"            <th>Age</th>\n",
"            <th>Income</th>\n",
"            <th>Score</th>\n",
"            <th>kclus</th>\n",
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"    <tbody>\n",
"        <tr>\n",
```

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"            <td>0.000000</td>\n",
"            <td>0.387755</td>\n",
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"            <td>0.816327</td>\n",
"            <td>7</td>\n",
"        </tr>\n",
"        <tr>\n",
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"            <td>0.0</td>\n",
"            <td>0.038462</td>\n",
"            <td>0.008493</td>\n",
"            <td>0.051020</td>\n",
"            <td>2</td>\n",
"        </tr>\n",
"        <tr>\n",
"            <th>3</th>\n",
```

```
"            <td>0.0</td>\n",
"            <td>0.096154</td>\n",
"            <td>0.008493</td>\n",
"            <td>0.775510</td>\n",
"            <td>2</td>\n",
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"        <tr>\n",
"            <th>4</th>\n",
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"            <td>0.250000</td>\n",
"            <td>0.016985</td>\n",
"            <td>0.397959</td>\n",
"            <td>2</td>\n",
"        </tr>\n",
"    </tbody>\n",
"</table>\n",
"</div>"
],
"text/plain": [
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"0       1.0  0.019231  0.000000  0.387755      7\n",
"1       1.0  0.057692  0.000000  0.816327      7\n",
"2       0.0  0.038462  0.008493  0.051020      2\n",
"3       0.0  0.096154  0.008493  0.775510      2\n",
"4       0.0  0.250000  0.016985  0.397959      2"
```

```
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   ]
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      ]
     },
     "execution_count": 29,
```

```
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    }
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  "source": [
    "data1['kclus'].unique()"
  ]
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  "metadata": {},
  "outputs": [
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      "data": {
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          "2       37\n",
          "5       26\n",
          "7       24\n",
          "4       22\n",
          "3       20\n",
          "1       18\n",
          "0       14\n",
```

```
        "Name: kclus, dtype: int64"
       ]
      },
      "execution_count": 30,
      "metadata": {},
      "output_type": "execute_result"
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    "source": [
     "data1['kclus'].value_counts()"
    ]
   },
   {
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    "id": "4da9bcf8",
    "metadata": {},
    "source": [
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    ]
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    "    }\n",
    "\n",
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    "        vertical-align: top;\n",
    "    }\n",
    "\n",
    "    .dataframe thead th {\n",
    "        text-align: right;\n",
    "    }\n",
    "</style>\n",
    "<table border=\"1\" class=\"dataframe\">\n",
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    "    <tr style=\"text-align: right;\">\n",
    "      <th></th>\n",
    "      <th>Gender</th>\n",
    "      <th>Age</th>\n",
    "      <th>Income</th>\n",
```

```
"            <th>Score</th>\n",
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"    </thead>\n",
"    <tbody>\n",
"        <tr>\n",
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"            <td>1.0</td>\n",
"            <td>0.019231</td>\n",
"            <td>0.000000</td>\n",
"            <td>0.387755</td>\n",
"        </tr>\n",
"        <tr>\n",
"            <th>1</th>\n",
"            <td>1.0</td>\n",
"            <td>0.057692</td>\n",
"            <td>0.000000</td>\n",
"            <td>0.816327</td>\n",
"        </tr>\n",
"        <tr>\n",
"            <th>2</th>\n",
"            <td>0.0</td>\n",
"            <td>0.038462</td>\n",
"            <td>0.008493</td>\n",
"            <td>0.051020</td>\n",
"        </tr>\n",
```

```
"        <tr>\n",
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"            <td>0.0</td>\n",
"            <td>0.096154</td>\n",
"            <td>0.008493</td>\n",
"            <td>0.775510</td>\n",
"        </tr>\n",
"        <tr>\n",
"            <th>4</th>\n",
"            <td>0.0</td>\n",
"            <td>0.250000</td>\n",
"            <td>0.016985</td>\n",
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"    </tbody>\n",
"</table>\n",
"</div>"
],
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"0       1.0  0.019231  0.000000  0.387755\n",
"1       1.0  0.057692  0.000000  0.816327\n",
"2       0.0  0.038462  0.008493  0.051020\n",
"3       0.0  0.096154  0.008493  0.775510\n",
"4       0.0  0.250000  0.016985  0.397959"
```

```
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  "metadata": {},
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  "data": {
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      "2       2\n",
      "3       2\n",
```

```
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    "metadata": {},
    "output_type": "execute_result"
   }
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   "dep.head()"
  ]
 },
 {
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  "metadata": {},
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"\n",
"        .dataframe thead th {\n",
"            text-align: right;\n",
"        }\n",
"</style>\n",
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"  <thead>\n",
"    <tr style=\"text-align: right;\">\n",
"      <th></th>\n",
"      <th>Gender</th>\n",
```

```
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"            <th>Income</th>\n",
"            <th>Score</th>\n",
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"        <tr>\n",
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"        <tr>\n",
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"            <td>0.331210</td>\n",
```

```
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"        <tr>\n",
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"            <td>0.357143</td>\n",
"        </tr>\n",
"        <tr>\n",
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],
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  "116          0.0  0.865385  0.424628  0.428571\n",
  "67           0.0  0.961538  0.280255  0.479592\n",
  "78           0.0  0.096154  0.331210  0.520408\n",
```

```
      "42          1.0    0.576923    0.203822    0.357143\n",
      "17          1.0    0.038462    0.050955    0.663265"
     ]
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"x_train,x_test,y_train,y_test=train_test_split(ind,dep,test_size=0.3,random_state=1)\n",
   "x_train.head()"
  ]
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"\n",
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"\n",
"    .dataframe thead th {\n",
"        text-align: right;\n",
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"      <th>Gender</th>\n",
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"      <th>Income</th>\n",
"      <th>Score</th>\n",
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```

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"            <td>0.346939</td>\n",
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"        <tr>\n",
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"            <td>0.152866</td>\n",
"            <td>0.132653</td>\n",
"        </tr>\n",
"        <tr>\n",
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"            <td>0.942308</td>\n",
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```

```
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"            <td>0.387755</td>\n",
"        </tr>\n",
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"40          0.0  0.903846  0.195329  0.346939\n",
"34          0.0  0.596154  0.152866  0.132653\n",
"102         1.0  0.942308  0.399151  0.591837\n",
"184         0.0  0.442308  0.713376  0.387755"
]
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"execution_count": 34,
"metadata": {},
"output_type": "execute_result"
```

```
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   ]
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   "metadata": {},
   "outputs": [
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      "text/plain": [
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       "67        6\n",
       "78        2\n",
       "42        5\n",
       "17        7\n",
       "Name: kclus, dtype: int32"
      ]
     },
     "execution_count": 35,
     "metadata": {},
```

```
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     }
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   "source": [
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   ]
  },
  {
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   "execution_count": 36,
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   "metadata": {},
   "outputs": [
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     "data": {
      "text/plain": [
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       "40         6\n",
       "34         6\n",
       "102        5\n",
       "184        0\n",
       "Name: kclus, dtype: int32"
      ]
     },
     "execution_count": 36,
```

```
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    }
   ],
   "source": [
    "y_test.head()"
   ]
  },
  {
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   "metadata": {},
   "source": [
    "## 13. Build the Model"
   ]
  },
  {
   "cell_type": "code",
   "execution_count": 37,
   "id": "f0c93140",
   "metadata": {},
   "outputs": [],
   "source": [
    "from sklearn.linear_model import LinearRegression"
   ]
```

```
},
{
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  "id": "3f831466",
  "metadata": {},
  "source": [
    "## 14. Train the Model"
  ]
},
{
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  "execution_count": 38,
  "id": "ecfeb333",
  "metadata": {},
  "outputs": [
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      "data": {
        "text/plain": [
          "LinearRegression()"
        ]
      },
  "execution_count": 38,
  "metadata": {},
  "output_type": "execute_result"
}
```

```
   ],
   "source": [
    "lr=LinearRegression()\n",
    "lr.fit(x_train,y_train)"
   ]
  },
  {
   "cell_type": "markdown",
   "id": "538ad1ef",
   "metadata": {},
   "source": [
    "## 15. Test the Model"
   ]
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   "metadata": {},
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       "       0.9138163 , 3.99372635, 5.19350506, 4.80948438, 2.30036365,\n",
```

```
        "           3.15511108, 6.21398598, 5.68255011, 4.08619851, 5.09904119,\n",
        "           3.71474946, 2.85178824, 4.53514454, 2.97579063, 5.40739582,\n",
        "           5.08237355, 5.10705763, 4.71691033, 3.43074311, 4.59987076,\n",
        "           2.59962965, 4.39518995, 4.89012359, 1.75852518, 5.73882422,\n",
        "           4.15995618, 2.75300805, 1.15864583, 3.03695723, 3.55345273,\n",
        "           3.34198847, 2.63139324, 4.79973659, 3.97373416, 2.89632664,\n",
        "           5.12004635, 4.72258009, 2.07288655, 5.76675215, 4.73564747,\n",
        "           5.50667176, 2.84606043, 4.29084043, 2.87949762, 2.64010658,\n",
        "           4.59575384, 4.36525377, 3.79220579, 5.82125255, 5.25598446,\n",
        "           3.22823077, 2.21272213, 4.38723184, 1.35281514, 2.93237028])"
       ]
      },
      "execution_count": 39,
      "metadata": {},
      "output_type": "execute_result"
     }
    ],
    "source": [
     "predi_test = lr.predict(x_test)\n",
     "predi_test"
    ]
   },
   {
    "cell_type": "markdown",
    "id": "0afe9dca",
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   "source": [
    "## 16. Measure the performance using Evaluation Metrics."
   ]
  },
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   "execution_count": 40,
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  "metadata": {},
  "outputs": [
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    "output_type": "stream",
    "text": [
     "The Mean squared error is:    3.6428577867860437\n"
    ]
   }
  ],
   "source": [
    "from sklearn.metrics import mean_squared_error,mean_absolute_error\n",
    "mse = mean_squared_error(predi_test,y_test)\n",
    "print(\"The Mean squared error is: \", mse)"
   ]
  },
```

```
{
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  "execution_count": 41,
  "id": "49df5aae",
  "metadata": {},
  "outputs": [
    {
      "name": "stdout",
      "output_type": "stream",
      "text": [
        "The Root mean squared error is:    1.9086271995300 82\n"
      ]
    }
  ],
"source": [
  "rmse = np.sqrt(mse)\n",
  "print(\"The Root mean squared error is: \", rmse)"
]
},
{
  "cell_type": "code",
  "execution_count": 42,
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```

```
   {
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     "The Mean absolute error is:    1.6560291186016136\n"
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   }
  ],
  "source": [
   "mae = mean_absolute_error(predi_test,y_test)\n",
   "print(\"The Mean absolute error is: \", mae)"
  ]
 },
 {
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  "metadata": {},
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   "name": "stdout",
   "output_type": "stream",
   "text": [
    "The accuracy is:    0.19326476178458663\n"
   ]
```

```
    }
   ],
   "source": [
    "from sklearn.metrics import accuracy_score\n",
    "acc = lr.score(x_test,y_test)\n",
    "print(\"The accuracy is: \", acc)"
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