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"#importing necessary lib\n",
"import pandas as pd\n",
"import numpy as np\n",
" \n",
"#load the dataset\n",
"df=pd.read_csv(r"C:\\Users\\ajayc\\Downloads\\student\\student-mat.csv", sep=";")\n",
"#display 5 rows\n",
"print(df.head())\n",
"\n"
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"print(df.isnull().sum())\n",
"# to Display column data types \n",
"print(df.dtypes)\n",
"#to Understand the dataset's size \n",
"print(df.shape)"
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" 21 internet 395 non-null object\n",
" 22 romantic 395 non-null object\n",
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" 25 goout 395 non-null int64 \n",
" 26 Dalc 395 non-null int64 \n",
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"1 GP F 17 U GT3 T 1 1 at_home other ... \n",
"2 GP F 15 U LE3 T 1 1 at_home other ... \n",
"3 GP F 15 U GT3 T 4 2 health services ... \n",
"4 GP F 16 U GT3 T 3 3 other other ... \n",
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" famrel freetime goout Dalc Walc health absences G1 G2 G3 \n",
"0 4 3 4 1 1 3 6 5 6 6 \n",
"1 5 3 3 1 1 3 4 5 5 6 \n",
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"\n",
"[5 rows x 33 columns]\n"
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    "# Fill numeric columns with the median\n",
    "num_cols = df.select_dtypes(include=['number']).columns\n",
    "df[num_cols] = df[num_cols].fillna(df[num_cols].median())\n",
    "\n",
    "# Fill categorical columns with the most frequent value (mode)\n",
    "cat_cols = df.select_dtypes(include=['object']).columns\n",
    "df[cat_cols] = df[cat_cols].apply(lambda x: x.fillna(x.mode()[0]))\n",
    "\n",
    "# Removing duplicate rows\n",
    "df.drop_duplicates(inplace=True)\n",
    "\n",
    "# Display cleaned dataset information\n",
    "print(\"Cleaned DataFrame:\")\n",
    "print(df.info()) # Shows dataset summary\n",
    "print(df.head()) # Displays the first few rows\n"]
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"average_G3=df["G3"].mean()\n",
"print(f"\nAverage final grade (G3):{average_G3:.2f}")\n",
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"#Count students scoring above 15 in G3\n",
"students_above_15=df[df["G3"] > 15].shape[0]\n",
"print(f"Number of students scoring above 15:{students_above_15}")\n",
"\n",
"#Correlation between Study Time and Final Grade (G3)\n",
"correlation=df["studytime"].corr(df["G3"])\n",
"print(f"Correlation between Study Time and G3:{correlation:.2f}")\n",
"\n",
"#Compare Average G3 Scores by Gender\n",
"avg_G3_by_gender=df.groupby("sex")["G3"].mean()\n",
"print("\nAverage G3 by Gender:")\n",
"print(avg_G3_by_gender)\n"
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hue=avg_G3_by_gender.index,palette={\"M\": \"blue\", \"F\": \"pink\"})\n",
"plt.title(\"Average Final Grade (G3) by Gender\")\n",
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"plt.ylabel(\"Average Final Grade (G3)\")\n",
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