```
In [1]:
          import pandas as pd
In [2]:
          Data1 = pd.read_csv('AcademicPerformance.csv')
          print(Data1)
             gender NationalITy PlaceofBirth
                                                       StageID GradeID SectionID
         0
                               KW
                                         KuwaIT
                                                    lowerlevel
                                                                   G-04
         1
                   Μ
                               KW
                                         KuwaIT
                                                    lowerlevel
                                                                   G-04
                                                                                NaN
         2
                               KW
                                         KuwaIT
                                                    lowerlevel
                                                                   G-04
                   Μ
                                                                                  Α
         3
                 NaN
                               KW
                                         KuwaIT
                                                    lowerlevel
                                                                   G-04
                                                                                  Α
                   Μ
                               KW
                                         KuwaIT
                                                    lowerlevel
                                                                   G-04
                                                                                  Α
                                             . . .
         475
                           Jordan
                                         Jordan MiddleSchool
                                                                   G-08
                                                                                  Α
         476
                   F
                           Jordan
                                         Jordan MiddleSchool
                                                                   G-08
                                                                                  Α
         477
                   F
                           Jordan
                                         Jordan
                                                  MiddleSchool
                                                                   G-08
                                                                                  Α
                   F
         478
                           Jordan
                                         Jordan
                                                  MiddleSchool
                                                                   G-08
                                                                                  Α
         479
                   F
                           Jordan
                                         Jordan MiddleSchool
                                                                   G-08
                                                                                  Α
                   Topic Semester Relation raisedhands VisITedResources
                                      Father
         0
                      IT
                                 F
                                                      15.0
                                                                          16.0
                                 F
         1
                      IT
                                      Father
                                                      20.0
                                                                          20.0
         2
                      IT
                               NaN
                                      Father
                                                      10.0
                                                                           7.0
         3
                      IT
                                 F
                                      Father
                                                      30.0
                                                                          25.0
                                 F
         4
                      IT
                                                      40.0
                                      Father
                                                                          50.0
                                         . . .
                                                        . . .
                                                                            . . .
                                 S
                                      Father
                                                       5.0
                                                                           4.0
         475
              Chemistry
                                                      50.0
                                                                          77.0
         476
                 Geology
                                 F
                                      Father
         477
                 Geology
                                 S
                                      Father
                                                      55.0
                                                                          74.0
         478
                                 F
                                      Father
                                                                          17.0
                 History
                                                      30.0
         479
                History
                                 S
                                      Father
                                                      35.0
                                                                          14.0
              AnnouncementsView Discussion ParentAnsweringSurvey
         0
                                            20
                              2.0
                                                                    Yes
         1
                              3.0
                                            25
                                                                    Yes
         2
                              0.0
                                            30
                                                                     15
                                            35
         3
                              5.0
                                                                     No
         4
                             12.0
                                            50
                                                                     No
                              . . .
         475
                              5.0
                                             8
                                                                     No
         476
                             14.0
                                            28
                                                                     No
         477
                             25.0
                                            29
                                                                     No
         478
                             14.0
                                            57
                                                                     No
         479
                             23.0
                                            62
                                                                     No
             ParentschoolSatisfaction StudentAbsenceDays Class
         0
                                   Good
                                                     Under-7
         1
                                    Good
                                                     Under-7
                                                                  Μ
         2
                                    Bad
                                                     Above-7
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                                                                  L
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                                     . . .
                                                          . . .
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                                    Bad
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                                                                  L
         479
                                    Bad
                                                     Above-7
                                                                  L
         [480 rows x 17 columns]
```

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Data1.shape

In [3]:

```
(480, 17)
Out[3]:
In [4]:
         Data1.isnull().sum()
         gender
                                       10
Out[4]:
                                        0
         NationalITy
         PlaceofBirth
                                        0
         StageID
                                        0
         GradeID
                                        0
         SectionID
                                        6
         Topic
                                        0
         Semester
                                        9
         Relation
                                        0
         raisedhands
                                       10
         VisITedResources
                                        5
                                        4
         AnnouncementsView
         Discussion
                                        0
                                        0
         ParentAnsweringSurvey
         ParentschoolSatisfaction
                                        0
         StudentAbsenceDays
                                        0
         Class
                                        0
         dtype: int64
In [5]:
         Data1.dropna(inplace=True)
          print(Data1.isnull().sum())
                                       0
         gender
         NationalITy
                                       0
         PlaceofBirth
                                       0
         StageID
                                       0
                                       0
         GradeID
         SectionID
                                       0
                                       0
         Topic
                                       0
         Semester
         Relation
                                       0
                                       0
         raisedhands
         VisITedResources
                                       0
         AnnouncementsView
                                       0
         Discussion
                                       0
         ParentAnsweringSurvey
                                       0
         ParentschoolSatisfaction
                                       0
                                       0
         StudentAbsenceDays
         Class
                                       0
         dtype: int64
In [6]:
          import pandas as pd
          import numpy as np
In [7]:
         Data2 = pd.read_csv('AcademicPerformance.csv')
          print(Data2)
             gender NationalITy PlaceofBirth
                                                      StageID GradeID SectionID
         0
                              KW
                                        KuwaIT
                                                   lowerlevel
                                                                 G-04
                                                                               Α
         1
                  Μ
                              KW
                                        KuwaIT
                                                   lowerlevel
                                                                 G-04
                                                                             NaN
         2
                  Μ
                              KW
                                                   lowerlevel
                                        KuwaIT
                                                                  G-04
                                                                               Α
         3
                NaN
                              KW
                                        KuwaIT
                                                   lowerlevel
                                                                  G-04
                                                                               Α
         4
                  Μ
                              KW
                                        KuwaIT
                                                   lowerlevel
                                                                 G-04
                                                                               Α
                                           . . .
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                                        Jordan MiddleSchool
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```

```
476
          F
                 Jordan
                                Jordan MiddleSchool
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          F
                                Jordan MiddleSchool
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478
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                                Jordan MiddleSchool
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479
          F
                 Jordan
                                Jordan MiddleSchool
                                                          G-08
                                                                         Α
          Topic Semester Relation raisedhands VisITedResources
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       Geology
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                            Father
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       History
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     AnnouncementsView Discussion ParentAnsweringSurvey
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                                                          Yes
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                                   29
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478
                   14.0
                                   57
                                                           No
479
                   23.0
                                   62
                                                           No
    ParentschoolSatisfaction StudentAbsenceDays Class
0
                          Good
                                            Under-7
                          Good
                                            Under-7
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2
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                                            Above-7
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                           Bad
                                            Above-7
                                                         L
4
                           Bad
                                            Above-7
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                                            Above-7
                                                         L
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                                            Under-7
                                                         Μ
477
                           Bad
                                            Under-7
                                                         Μ
478
                           Bad
                                            Above-7
                                                         L
479
                           Bad
                                            Above-7
                                                         L
[480 rows x 17 columns]
```

In [8]: Data2.notnull()

Out[8]:		gender	NationalITy	PlaceofBirth	StageID	GradeID	SectionID	Topic	Semester	Relation	rais
	0	True	True	True	True	True	True	True	True	True	
	1	True	True	True	True	True	False	True	True	True	
	2	True	True	True	True	True	True	True	False	True	
	3	False	True	True	True	True	True	True	True	True	
	4	True	True	True	True	True	True	True	True	True	
	•••										
	475	True	True	True	True	True	True	True	True	True	
	476	True	True	True	True	True	True	True	True	True	

	gender	NationalITy	PlaceofBirth	StageID	GradeID	SectionID	Topic	Semester	Relation	rais
477	True	True	True	True	True	True	True	True	True	
478	True	True	True	True	True	True	True	True	True	
479	True	True	True	True	True	True	True	True	True	

480 rows × 17 columns

In [9]: series1 = pd.notnull(Data2["raisedhands"])
 Data2[series1]

Out[9]:		gender	NationalITy	PlaceofBirth	StageID	GradeID	SectionID	Topic	Semester	Rela
	0	M	KW	KuwalT	lowerlevel	G-04	A	IT	F	Fa
	U	171	KVV	Ruwaii	loweriever	0 04	^	- 11	'	ıa
	1	М	KW	KuwalT	lowerlevel	G-04	NaN	IT	F	Fa
	2	М	KW	KuwalT	lowerlevel	G-04	Α	IT	NaN	Fa
	3	NaN	KW	KuwalT	lowerlevel	G-04	А	IT	F	Fa
	4	М	KW	KuwalT	lowerlevel	G-04	Α	IT	F	Fa
	•••							•••		
	475	F	Jordan	Jordan	MiddleSchool	G-08	А	Chemistry	S	Fa
	476	F	Jordan	Jordan	MiddleSchool	G-08	А	Geology	F	Fa
	477	F	Jordan	Jordan	MiddleSchool	G-08	Α	Geology	S	Fa
	478	F	Jordan	Jordan	MiddleSchool	G-08	А	History	F	Fa
	479	F	Jordan	Jordan	MiddleSchool	G-08	А	History	S	Fa

470 rows × 17 columns

→

In [10]:

df=Data2
df.fillna(0)

Out[10]:		gender	NationalITy	PlaceofBirth	StageID	GradeID	SectionID	Topic	Semester	Rela
	0	М	KW	KuwalT	lowerlevel	G-04	А	IT	F	Fa
	1	М	KW	KuwalT	lowerlevel	G-04	0	IT	F	Fa
	2	М	KW	KuwalT	lowerlevel	G-04	А	IT	0	Fa
	3	0	KW	KuwalT	lowerlevel	G-04	А	IT	F	Fa
	4	М	KW	KuwalT	lowerlevel	G-04	А	IT	F	Fa
	•••									
	475	F	Jordan	Jordan	MiddleSchool	G-08	А	Chemistry	S	Fa
	476	F	Jordan	Jordan	MiddleSchool	G-08	А	Geology	F	Fa
	477	F	Jordan	Jordan	MiddleSchool	G-08	А	Geology	S	Fa

-,										
		gender	NationalITy	PlaceofBirth	StageID	GradeID	SectionID	Topic	Semester	Rela
	478	F	Jordan	Jordan	MiddleSchool	G-08	А	History	F	Fa
	479	F	Jordan	Jordan	MiddleSchool	G-08	Α	History	S	Fa
	480 rc	ows × 17	7 columns							
In [11]:	df[ˈ	'GradeII	D'].fillna('Grade')						
Out[11]:	0	G-04								
Jul[II].	1	G-04								
	2	G-04								
	3	G-04								
	4	G-04								
	475									
	475	G-08								
	476	G-08								
	477 478	G-08 G-08								
	478 479	G-08								
				480, dtype	: object					
n [12]:	df['VisIT	edResources	'].fillna(d	f['VisITedR	esources	'].mean())			
. [40]	0	16.0								
ut[12]:	1	20.0								
	2	7.0								
	3	25.0								
	4	50.0								
	475	4.0								
	476	77.0								
	477	74.0								
	478	17.0								
	479	14.0								

Name: VisITedResources, Length: 480, dtype: float64

df['Class'].value_counts()

```
In [13]:
          df[ 'VisITedResources'].fillna(df[ 'VisITedResources'].median())
                16.0
Out[13]:
                 20.0
         2
                 7.0
         3
                25.0
                 50.0
         475
                 4.0
         476
                77.0
         477
                74.0
         478
                17.0
         479
                14.0
         Name: VisITedResources, Length: 480, dtype: float64
```

In [15]:

211 Out[15]: 142 127 Name: Class, dtype: int64 In [16]: df['Class'].fillna(df['Class'].mode()[0]) Out[16]: Μ 2 L 3 L 4 475 476 477 Μ 478 479 Name: Class, Length: 480, dtype: object In [17]: df.fillna(method="backfill") gender NationalITy PlaceofBirth StageID GradeID SectionID Topic Semester Rela Out[17]: 0 KuwalT lowerlevel G-04 ΙT F Μ KW Α Fa 1 Μ KW KuwalT lowerlevel G-04 Α ΙT F Fa 2 KuwalT lowerlevel G-04 F Μ KW Α ΙT Fa 3 KuwalT lowerlevel G-04 F Μ KW Α ΙT Fa F 4 Μ KW KuwalT lowerlevel G-04 Α IT Fa ... 475 F Jordan Jordan MiddleSchool G-08 Α Chemistry S Fa F F 476 Jordan MiddleSchool G-08 Geology Fa Jordan 477 F MiddleSchool G-08 Jordan Jordan Α Geology S Fa F 478 F Jordan Jordan MiddleSchool G-08 History Fa F Jordan MiddleSchool S 479 Jordan G-08 Α History Fa 480 rows × 17 columns In [18]: df.fillna(method="pad") gender NationalITy PlaceofBirth Out[18]: StageID GradeID SectionID **Topic Semester Rela**

	0	М	KW	KuwalT	lowerlevel	G-04	Α	IT	F	Fa
	1	М	KW	KuwalT	lowerlevel	G-04	Α	IT	F	Fa
	2	М	KW	KuwalT	lowerlevel	G-04	Α	IT	F	Fa
	3	М	KW	KuwalT	lowerlevel	G-04	Α	IT	F	Fa
	4	М	KW	KuwalT	lowerlevel	G-04	Α	IT	F	Fa
	•••							•••		
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	gender	NationalITy	PlaceofBirth	StageID	GradeID	SectionID	Topic	Semester	Rela
475	F	Jordan	Jordan	MiddleSchool	G-08	А	Chemistry	S	Fa
476	F	Jordan	Jordan	MiddleSchool	G-08	А	Geology	F	Fa
477	F	Jordan	Jordan	MiddleSchool	G-08	А	Geology	S	Fa
478	F	Jordan	Jordan	MiddleSchool	G-08	А	History	F	Fa
479	F	Jordan	Jordan	MiddleSchool	G-08	А	History	S	Fa

480 rows × 17 columns

n [19]:	df.describe()						
t[19]:		raisedhands	VislTedResources	AnnouncementsView	Discussion		
	count	470.000000	475.000000	476.000000	480.000000		
	mean	47.506383	55.374737	38.237395	43.283333		
	std	30.483226	32.769213	26.493621	27.637735		
	min	0.000000	0.000000	0.000000	1.000000		
	25%	17.000000	20.000000	15.000000	20.000000		
	50%	50.000000	66.000000	33.000000	39.000000		
	75%	75.000000	84.000000	58.000000	70.000000		
	max	100.000000	99.000000	98.000000	99.000000		
[]:							
[]:							
[]:							
[]:							
[]:							