Using loc, iloc and ix

There are three ways to select data from a data frame in Pandas: *loc*, *iloc*, and *ix*.

loc

loc is primarily label based; when two arguments are used, you use column headers and row indexes to select the data you want. *loc* can also take an integer as a row or column number.

Examples of *loc* usage:

df.loc[0, 'Artist']:'Michael Jackson' df.loc[0, 'Released']:1982

df.loc[1, 'Artist']:'AC/DC' df.loc[1, 'Released']:1980

	Artist	Album	Released	Length	Genre	Music Recording Sales (millions)	Claimed Sales (millions)	Released.1	Soundtrack	Rating
0	Michael Jackson	Thriller	1982	0:42:19	pop, rock, R&B	46.0	65	30-Nov-82	NaN	10.0
1	AC/DC	Back in Black	1980	0:42:11	hard rock	26.1	50	25-Jul-80	NaN	9.5
2	Pink Floyd	The Dark Side of the Moon	1973	0:42:49	progressive rock	24.2	45	01-Mar-73	NaN	9.0
3	Whitney Houston	The Bodyguard	1992	0:57:44	R&B, soul, pop	27.4	44	17-Nov-92	Y	8.5
4	Meat Loaf	Bat Out of Hell	1977	0:46:33	hard rock, progressive rock	20.6	43	21-Oct-77	NaN	8.0
5	Eagles	Their Greatest Hits (1971-1975)	1976	0:43:08	rock, soft rock, folk rock	32.2	42	17-Feb-76	NaN	7.5
6	Bee Gees	Saturday Night Fever	1977	1:15:54	disco	20.6	40	15-Nov-77	Y	7.0
7	Fleetwood Mac	Rumours	1977	0:40:01	soft rock	27.9	40	04-Feb-77	NaN	6.5

loc will return a *KeyError* if the requested items are not found.

iloc

iloc is integer-based. You use column numbers and row numbers to get rows or columns at particular positions in the data frame.

Examples of *iloc* usage:

df.iloc[0,0]:'Michael Jackson'

df.iloc[1,0]: 'AC/DC'

df.iloc[0,2]:1982

df.iloc[1,2]:1980

	Artist	Album	Released	Length	Genre	Music Recording Sales (millions)	Claimed Sales (millions)	Released.1	Soundtrack	Rating
0	Michael Jackson	Thriller	1982	0:42:19	pop, rock, R&B	46.0	65	30-Nov-82	NaN	10.0
1	AC/DC	Back in Black	1980	0:42:11	hard rock	26.1	50	25-Jul-80	NaN	9.5
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6	Bee Gees	Saturday Night Fever	1977	1:15:54	disco	20.6	40	15-Nov-77	Y	7.0
7	Fleetwood Mac	Rumours	1977	0:40:01	soft rock	27.9	40	04-Feb-77	NaN	6.5

iloc will return an *IndexError* if the requested indexer is out-of-bounds.

ix

By default, *ix* looks for a label. If ix doesn't find a label, it will use an integer. This means you can select data by using either column numbers and row numbers or column headers and row names using *ix*.

In Pandas version 0.20.0 and later, *ix* is deprecated.

Using loc and iloc for slicing

You can also use *loc* and *iloc* to slice data frames and assign the values to a new data frame.

Creating a new dataframe with loc slicing

You can also slice data frames and assign the values to a new data frame using the column names. The code assigns the first three rows and all columns in between to the columns named Artist and Released. The result is a new data frame Z with the corresponding values.

```
z=df.loc [0:2, 'Artist':'Released']
```

	Artist	Album	Released	Length	Genre	Music Recording Sales (millions)	Claimed Sales (millions)	Released.1	Soundtrack	Rating
0	Michael Jackson	Thriller	1982	0:42:19	pop, rock, R&B	46.0	65	30-Nov-82	NaN	10.0
1	AC/DC	Back in Black	1980	0:42:11	hard rock	26.1	50	25-Jul-80	NaN	9.5
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6	Bee Gees	Saturday Night Fever	1977	1:15:54	disco	20.6	40	15-Nov-77	Y	7.0
7	Fleetwood Mac	Rumours	1977	0:40:01	soft rock	27.9	40	04-Feb-77	NaN	6.5

Z

	Artist	Album	Released
0	Michael Jackson	Thriller	1982
1	AC/DC	Back in Black	1980
2	Pink Floyd	The Dark Side of the Moon	1973

Creating a new dataframe with iloc slicing

In this example, we assign the first two rows and the first three columns to the variable Z. The result is a data frame comprised of the selected rows and columns.

```
z=df.iloc[0:2, 0:3]
```

	Artist	Album	Released	Length	Genre	Music Recording Sales (millions)	Claimed Sales (millions)	Released.1	Soundtrack	Rating
0	Michael Jackson	Thriller	1982	0:42:19	pop, rock, R&B	46.0	65	30-Nov-82	NaN	10.0
1	AC/DC	Back in Black	1980	0:42:11	hard rock	26.1	50	25-Jul-80	NaN	9.5
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7	Fleetwood Mac	Rumours	1977	0:40:01	soft rock	27.9	40	04-Feb-77	NaN	6.5

Z

	Artist	Album	Released
0	Michael Jackson	Thriller	1982
1	AC/DC	Back in Black	1980

Complete