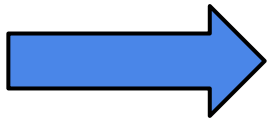
XLOOKUP, INDEX, and MATCH

Recall: VLOOKUP

	A	B
1	movie_id	title
2	4613	Pirates of the Caribbean
3	4956	The Ring
4	6604	Evan Almighty
5	4501	Ace Venture: When Nature Calls
6	2791	Baby Mama
7	1384	Baby Driver

If we want to find the title of a movie with a given movie_id, we can use VLOOKUP.

VLOOKUP(4956, A2:B7, 2, FALSE) 

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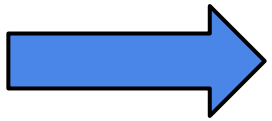
VLOOKUP(4956, A2:B7, 2, FALSE)  The Ring

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But what if we want to find the movie_id for a given movie title?

VLOOKUP can only look to the right, so cannot be used in this situation.

XLOOKUP

Searches an array and then returns the corresponding item from another array.

XLOOKUP(lookup_value, lookup_array, return_array, [if_not_found], [match_mode], [search_mode])

By default looks for an exact match.

XLOOKUP

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XLOOKUP("Evan Almighty",B2:B7,A2:A7)

XLOOKUP

	A	B
1	movie_id	title
2	4613	Pirates of the Caribbean
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Look in this range.

XLOOKUP("Evan Almighty",B2:B7,A2:A7)

XLOOKUP

	A	B
1	movie_id	title
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6	2791	Baby Mama
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Return the corresponding value from this range

XLOOKUP("Evan Almighty",B2:B7,A2:A7)

XLOOKUP

	A	B
1	movie_id	title
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Return the corresponding value from this range

XLOOKUP("Evan Almighty",B2:B7,A2:A7)

Result: 6604

INDEX

Returns the element of an array at a specified row and column.

INDEX(array, row_num, [column_num])

INDEX

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1	movie_id	title
2	4613	Pirates of the Caribbean
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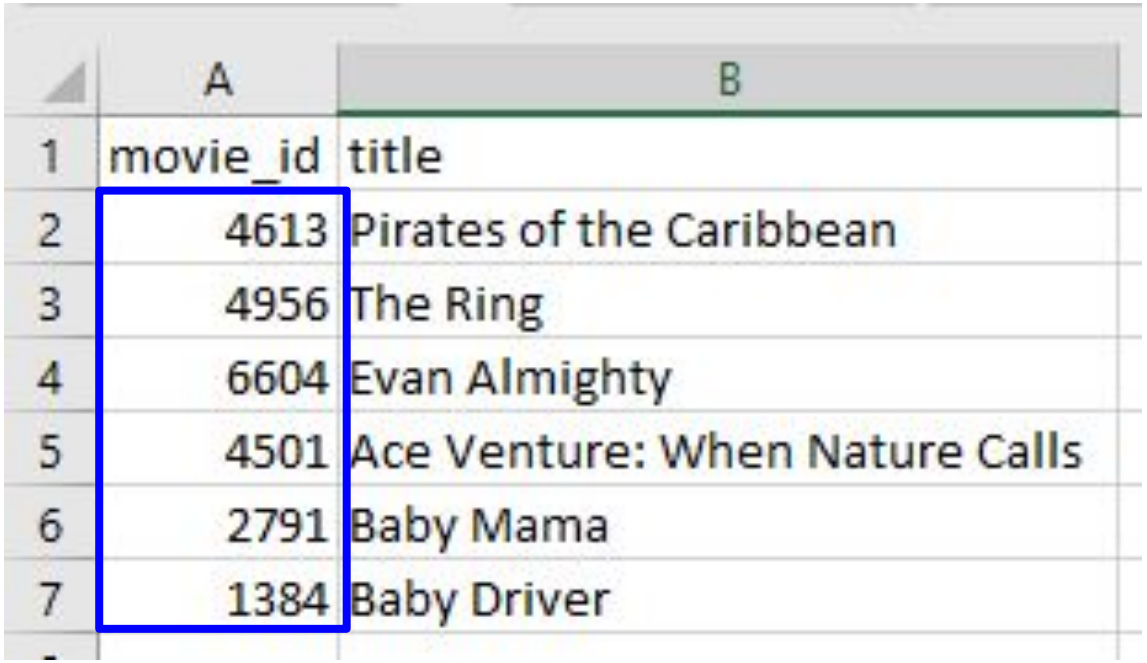
INDEX(A2:A7, 3)

INDEX



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INDEX(A2:A7, 3)

INDEX

	A	B
1	movie_id	title
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6	2791	Baby Mama
7	1384	Baby Driver

INDEX(A2:A7, 3) → 6604

INDEX

	A	B
1	movie_id	title
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Question: What is the result of INDEX(B2:B7, 5)?

INDEX

	A	B
1	movie_id	title
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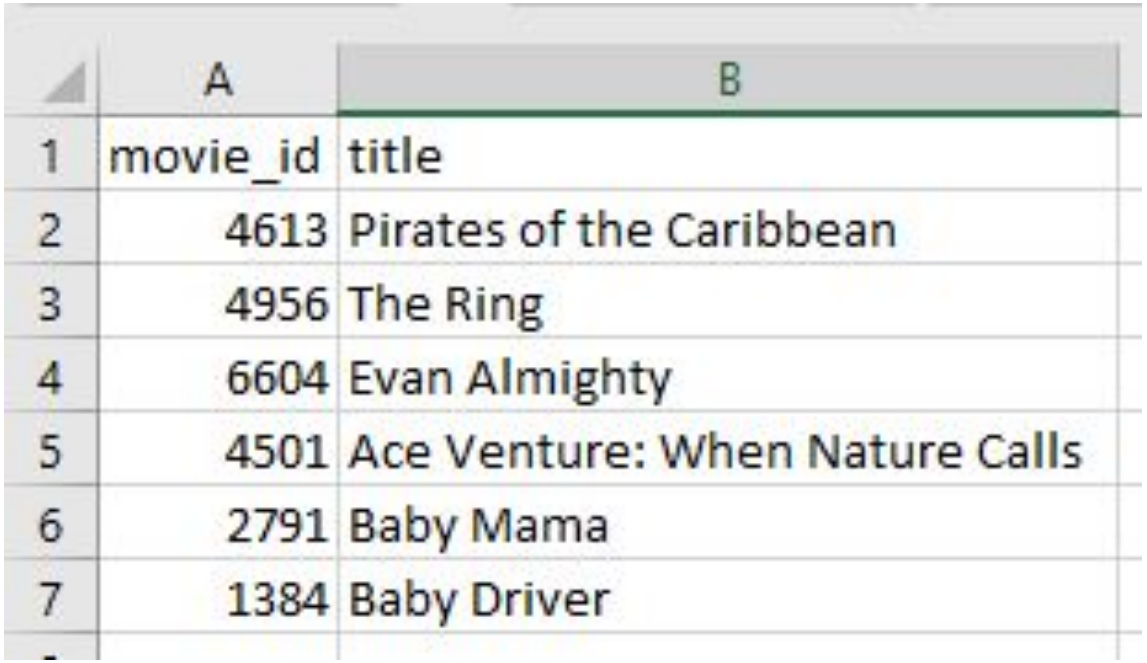
Question: What is the result of INDEX(B2:B7, 5)?

Answer: Baby Mama

INDEX



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7	1384	Baby Driver

The INDEX function allows us to return an element of an array if we know the row number (and/or column number) of the element we want.

But what if we want to get the movie_id based on a title instead of on the row number?

MATCH

Searches for a specified item in a range of cells, and then returns the relative position of that item in the range.

MATCH(lookup_value, lookup_array, [match_type])

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Searches for a specified item in a range of cells, and then returns the relative position of that item in the range.

MATCH(lookup_value, lookup_array, [match_type])

1: largest value less than or equal to lookup_value

0: exact match

-1: smallest value greater than or equal to lookup_value

MATCH

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2	4613	Pirates of the Caribbean
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5	4501	Ace Venture: When Nature Calls
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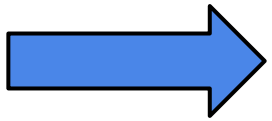
7	1384	Baby Driver

MATCH("The Ring", B2:B7, 0)



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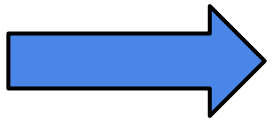
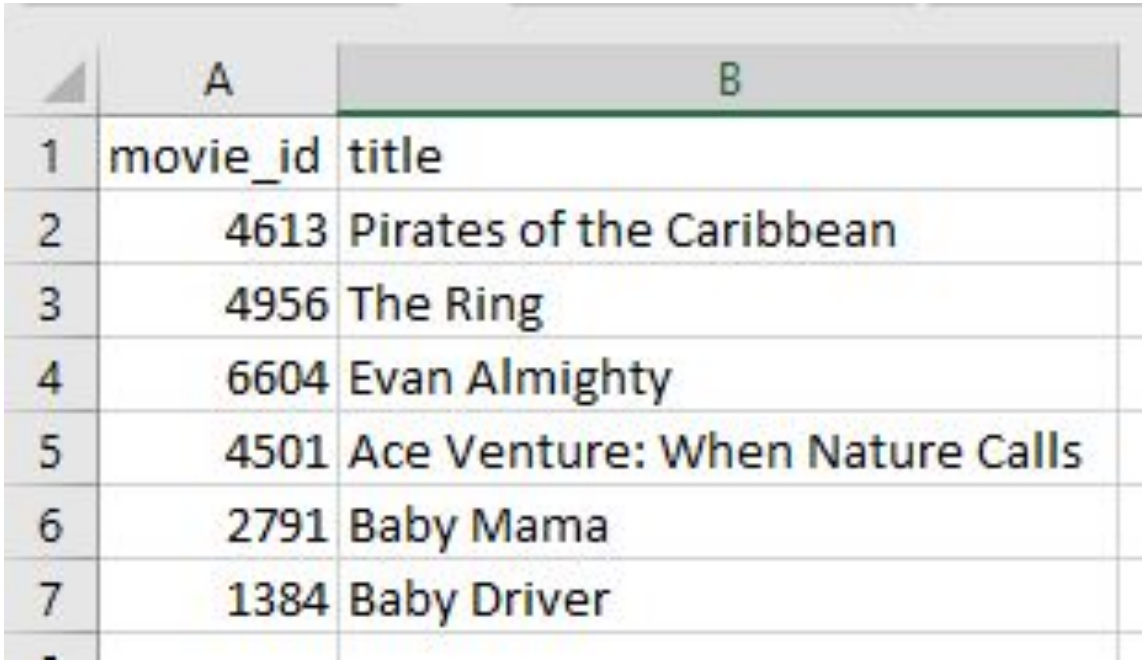
MATCH("The Ring", B2:B7, 0)  2

INDEX/MATCH



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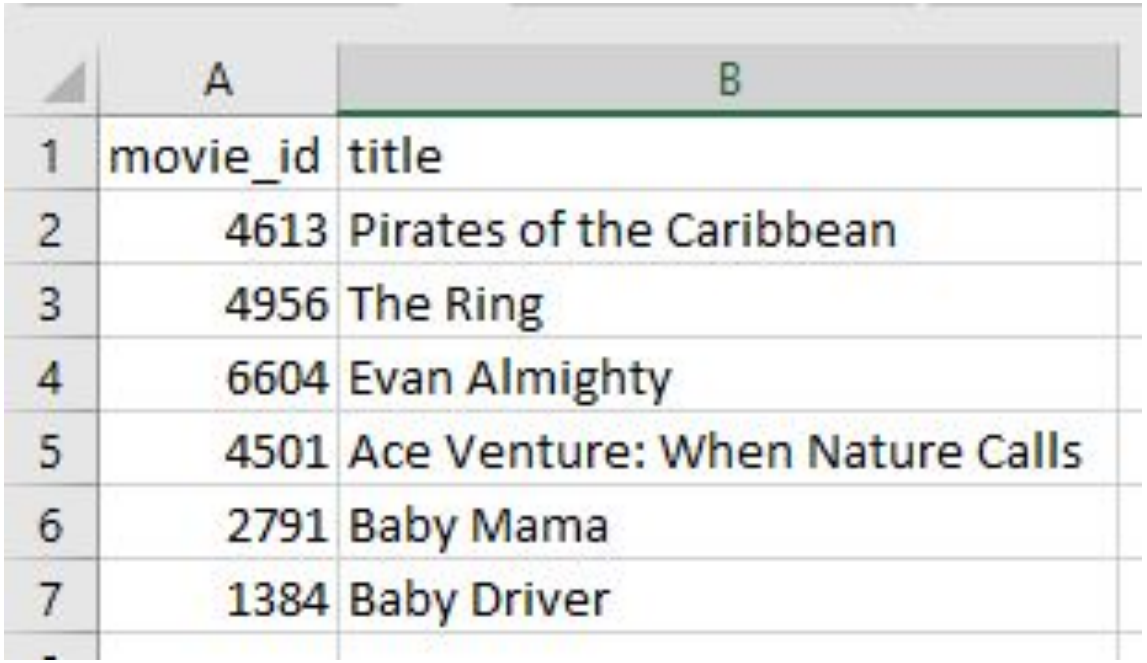
By combining INDEX and MATCH, we can retrieve elements of arrays regardless of which direction we need to look in.

INDEX/MATCH



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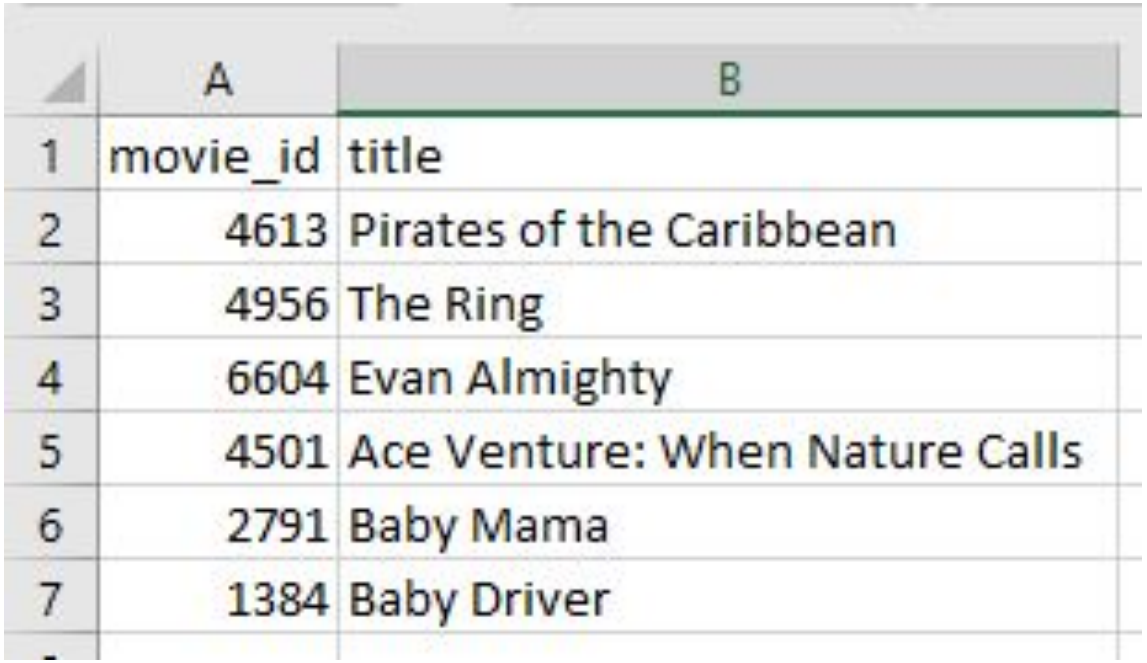
Example: Let's find the movie_id for the movie Baby Driver using INDEX and MATCH.

INDEX(,)

INDEX/MATCH



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Example: Let's find the movie_id for the movie Baby Driver using INDEX and MATCH.

INDEX(A2:A7,)

Search in the array which contains movie_id.

INDEX/MATCH

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Example: Let's find the movie_id for the movie Baby Driver using INDEX and MATCH.

INDEX(A2:A7,MATCH("Baby Driver", B2:B7, 0))

Look in the same row as the row in the title column containing "Baby Driver".

INDEX/MATCH

You can also use INDEX and MATCH to search for elements based on both row and column values.

INDEX/MATCH

	A	B	C	D
1		2007	2008	2009
2	Best Picture	No Country for Old Men	Slumdog Millionaire	The Hurt Locker
3	Best Director	Joel Coen and Ethan Coen	Danny Boyle	Kathryn Bigelow
4	Best Actor	Daniel Day-Lewis	Sean Penn	Jeff Bridges
5	Best Actress	Marion Cotillard	Kate Winslet	Sandra Bullock

INDEX/MATCH

	A	B	C	D
1		2007	2008	2009
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4	Best Actor	Daniel Day-Lewis	Sean Penn	Jeff Bridges
5	Best Actress	Marion Cotillard	Kate Winslet	Sandra Bullock

INDEX(B2:D5,MATCH("Best Actor", A2:A5,0), MATCH(2008, B1:D1,0))

INDEX/MATCH

	A	B	C	D
1		2007	2008	2009
2	Best Picture	No Country for Old Men	Slumdog Millionaire	The Hurt Locker
3	Best Director	Joel Coen and Ethan Coen	Danny Boyle	Kathryn Bigelow
4	Best Actor	Daniel Day-Lewis	Sean Penn	Jeff Bridges
5	Best Actress	Marion Cotillard	Kate Winslet	Sandra Bullock

INDEX(B2:D5,MATCH("Best Actor", A2:A5,0), MATCH(2008, B1:D1,0))

INDEX/MATCH

	A	B	C	D
1		2007	2008	2009
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4	Best Actor	Daniel Day-Lewis	Sean Penn	Jeff Bridges
5	Best Actress	Marion Cotillard	Kate Winslet	Sandra Bullock

INDEX(B2:D5,MATCH("Best Actor", A2:A5,0), MATCH(2008, B1:D1,0))

row_num:
col_num:

INDEX/MATCH

	A	B	C	D
1		2007	2008	2009
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4	Best Actor	Daniel Day-Lewis	Sean Penn	Jeff Bridges
5	Best Actress	Marion Cotillard	Kate Winslet	Sandra Bullock

INDEX(B2:D5,MATCH("Best Actor", A2:A5,0), MATCH(2008, B1:D1,0))

row_num: 3
col_num:

INDEX/MATCH

	A	B	C	D
1		2007	2008	2009
2	Best Picture	No Country for Old Men	Slumdog Millionaire	The Hurt Locker
3	Best Director	Joel Coen and Ethan Coen	Danny Boyle	Kathryn Bigelow
4	Best Actor	Daniel Day-Lewis	Sean Penn	Jeff Bridges
5	Best Actress	Marion Cotillard	Kate Winslet	Sandra Bullock

INDEX(B2:D5,MATCH("Best Actor", A2:A5,0), MATCH(2008, B1:D1,0))

row_num: 3
col_num: 2

INDEX/MATCH

	A	B	C	D
1		2007	2008	2009
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5	Best Actress	Marion Cotillard	Kate Winslet	Sandra Bullock

INDEX(B2:D5,MATCH("Best Actor", A2:A5,0), MATCH(2008, B1:D1,0))

row_num: 3
col_num: 2

Result: Sean Penn

Exercises

1. Build a pivot table *in a new worksheet* of the Metro_Budget_to_Actual_Expenses__FY14-Present workbook.
   a. Call the worksheet **high_expense**.
   b. Use Department Description for the Row.
   c. Create two Values (Sum of FY19 Budgeted Expenses and Sum of FY19 Actual Expenses.
   d. Add a filter to show only those departments that had actual expenses that were over $100 million.

2. Create a new pivot table in the same workbook.
   a. Call the worksheet for this pivot table **training**.
   b. Add both the Department Description and the Business Unit Description to the Rows.
   c. Filter the Business Unit Description to show only the items that contain the word ***training***.

3. Create **three more pivot tables *one at a time*** to show FY19 budgeted and actual expenses for the MNPS General Purpose (Fund Description) spending on Books, Magazines, and Periodicals (Object Account Description).
   a. Call the first one filter_slicers and use two slicers to filter the report.
   b. Call the second one filter_manual. Use the magic cell to create manual filters in order to filter the report.
   c. Call the third one filter_report. This time add filters in the pivot table fields control.