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Making the most of INDEX/MATCH

Part 1: MATCH in multiple columns

Courtney Lake: Technical Trainer, Smartsheet

Part 2: Using INDEX/MATCH/MATCH

Heather Duff: Senior Pro Desk Specialist, Smartsheet

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Meet the speakers!

Courtney Lake
Technical Trainer

Heather Duff
Senior Pro Desk Specialist

INDEX/MATCH

A powerful pair

Link data across sheets

Use a unique value to retrieve matching data from other sheets

Reduce repetitive data entry

Maintain data in a single source and populate multiple destinations

Ensure consistent values

Confirm that an ID or project name aligns with a master list

INDEX/MATCH

The standard two-column method

=INDEX({Column with desired value in source sheet},

MATCH([Lookup value]@row, {Column with lookup value in source sheet}, 0))

INDEX

Returns the value from the desired column in the Source Sheet, based on the location found by MATCH

MATCH

Locates the lookup value in the destination sheet within a lookup column in the source sheet

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MATCH with multiple columns

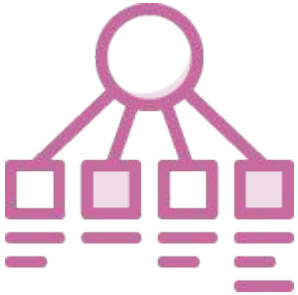
How to modify MATCH when the lookup value could be in two or more columns

Learning objectives

What's in it for me?

1. Understand how MATCH locates search values in the range
2. Explain how a range including multiple columns affects the result of MATCH
3. Modify the output of MATCH in these scenarios to determine a row number

What happens when using multiple columns within MATCH?



MATCH

Not a row number finder

The result of a MATCH function is the **relative position** of the search value within the range

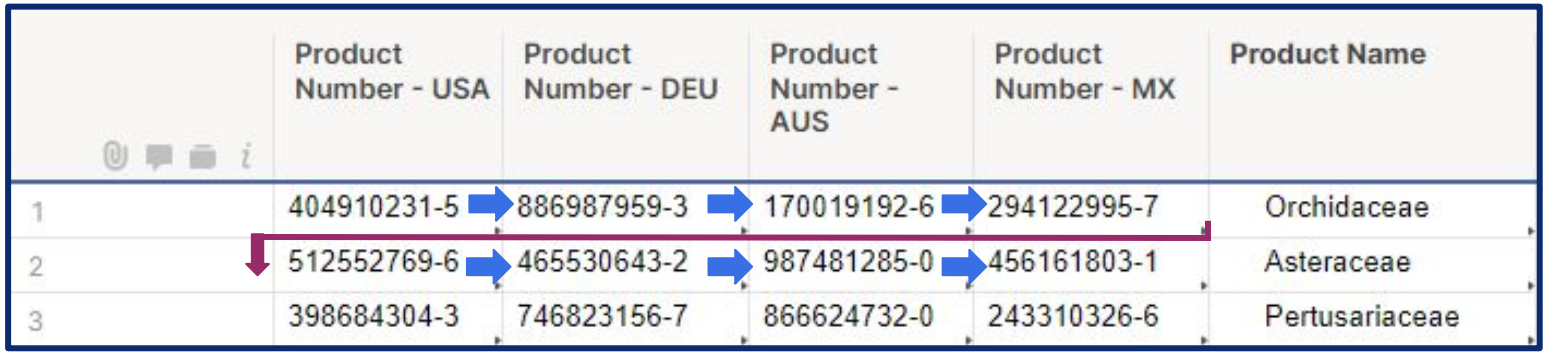
How relative position works

Single-column ranges

		Product Number	Product Name	Manufacturing Cost
1	1	404910231-5	Orchidaceae	$93.46
2	2	512552769-6	Asteraceae	$45.19
3	3	398684304-3	Orchidaceae	$18.64
4	4	855575948-X	Brassicaceae	$42.29
5	5	026072928-0	Anacardiaceae	$7.11

How relative position works

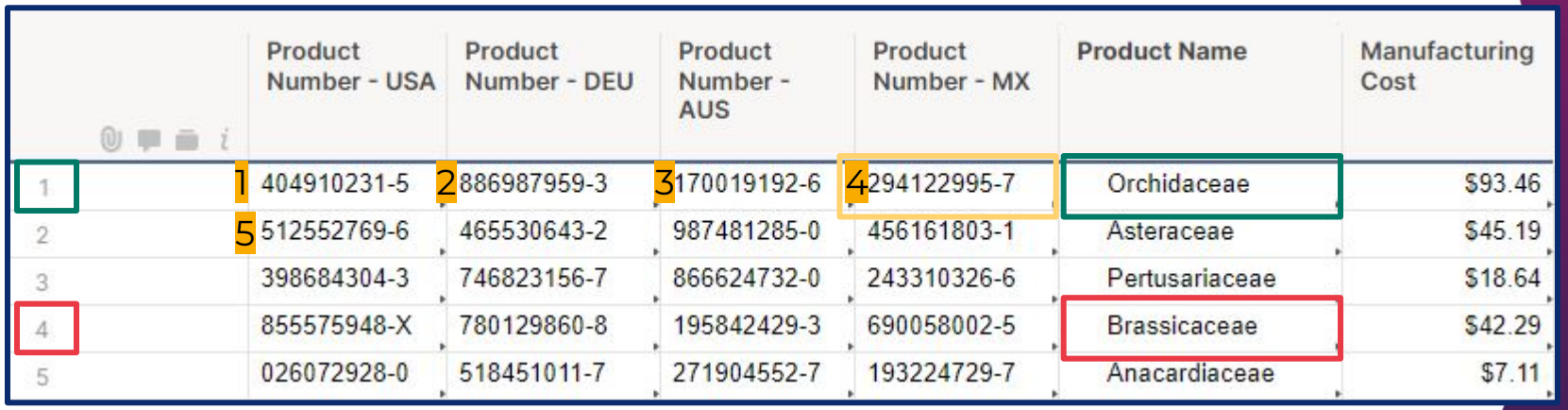
Multi-column ranges



	Product Number - USA	Product Number - DEU	Product Number - AUS	Product Number - MX	Product Name
1	404910231-5	886987959-3	170019192-6	294122995-7	Orchidaceae
2	512552769-6	465530643-2	987481285-0	456161803-1	Asteraceae
3	398684304-3	746823156-7	866624732-0	243310326-6	Pertusariaceae

How relative position works

Multi-column ranges



	Product Number - USA	Product Number - DEU	Product Number - AUS	Product Number - MX	Product Name	Manufacturing Cost
1	1 404910231-5	2 886987959-3	3 170019192-6	4 294122995-7	Orchidaceae	$93.46
2	5 512552769-6	465530643-2	987481285-0	456161803-1	Asteraceae	$45.19
3	398684304-3	746823156-7	866624732-0	243310326-6	Pertusariaceae	$18.64
4	855575948-X	780129860-8	195842429-3	690058002-5	Brassicaceae	$42.29
5	026072928-0	518451011-7	271904552-7	193224729-7	Anacardiaceae	$7.11

Finding product data

With multiple product IDs

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Tips for using MATCH

Select search type: 0

Syntax

```
MATCH( search_value , range , [ search_type ])
```

- Requires an exact match
- Ensures all values are compared
- Indicates the data is not sorted in the order of searching

Using multiple columns in INDEX

When to use column_index

Syntax

```
INDEX( range , row_index , [ column_index ])
```

- `range` — The group of cells that you want to evaluate
- `row_index` — The row position (used in a one-dimensional collection such as a list) of the item to return
- `column_index` —[optional] The column position (used in a two-dimensional collection such as a table) of the item to return

2

INDEX/MATCH/MATCH

How to create flexible, dynamic INDEX/MATCH/MATCH formulas to locate and display data from within a table using two lookup values

Learning objectives

1. Understand how INDEX/MATCH/MATCH locates values based on rows and columns
2. Learn how and why to use INDEX/MATCH/MATCH to replace a VLOOKUP

INDEX/MATCH

Rows and columns in a standard INDEX/MATCH

=INDEX({Column with desired value in Source sheet},
MATCH([Lookup Value in Destination Sheet]@row,
{Column with lookup value in Source Sheet}, 0))

Lookup Value	Value to return
Proj-001	Project Alpha
Proj-002	Project Bravo
Proj-003	Project Charlie

INDEX/MATCH > VLOOKUP

In a VLOOKUP, you have to reference column numbers.

If source sheet columns are rearranged, what happens?

INDEX/MATCH/MATCH

Rows and columns in an INDEX/MATCH/MATCH

=INDEX({Entire Source Table},

MATCH([Row Label]@row, {Row Label Range}, 0),

MATCH([Column Label]@row, {Column Label Range}, 0))

	↓ Impact | Urgency →	Low	Medium	High
1		Low	Medium	High
2	Low	1	3	6
3	Medium	2	4	8
4	High	5	7	9

Prioritization matrix

Using INDEX/MATCH/MATCH to assign priority score based on impact & urgency

↓ Impact | Urgency →	Low	Medium	High
	Low	Medium	High
Low	1	3	6
Medium	2	4	8
High	5	7	9

Setting up your source sheet

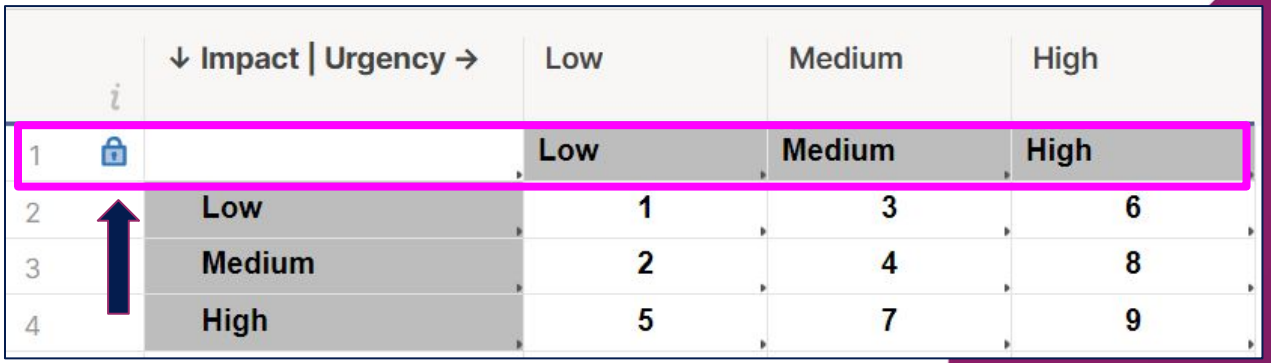
Row labels

	↓ Impact | Urgency →	Low	Medium	High
1		Low	Medium	High
2	Low	1	3	6
3	Medium	2	4	8
4	High	5	7	9

Setting up your source sheet

Column labels

Why do we need to enter the column name in a row?



	↓ Impact | Urgency →	Low	Medium	High
1		Low	Medium	High
2	Low	1	3	6
3	Medium	2	4	8
4	High	5	7	9

Project ID	Impact	Urgency	Priority Score
PRJ-001	Low	Low	
PRJ-002	Medium	Medium	
PRJ-003	Low	High	
PRJ-004	Medium	Low	
PRJ-005	Medium	High	
PRJ-006	High	Medium	
PRJ-007	Low	Medium	
PRJ-008	High	Low	
PRJ-009	High	High	

Setting up your destination sheet

One column for row labels (Impact)

One column for column labels (Urgency)

One column for formula (Priority score)

Formula: INDEX

INDEX range points to entire table

=INDEX({Entire table},

	↓ Impact | Urgency →	Low	Medium	High
1		Low	Medium	High
2	Low	1	3	6
3	Medium	2	4	8
4	High	5	7	9

Formula: First MATCH

First MATCH points to row labels

```
=INDEX({Entire table},
        MATCH([Row label]@row, {Row Labels}, 0),
```

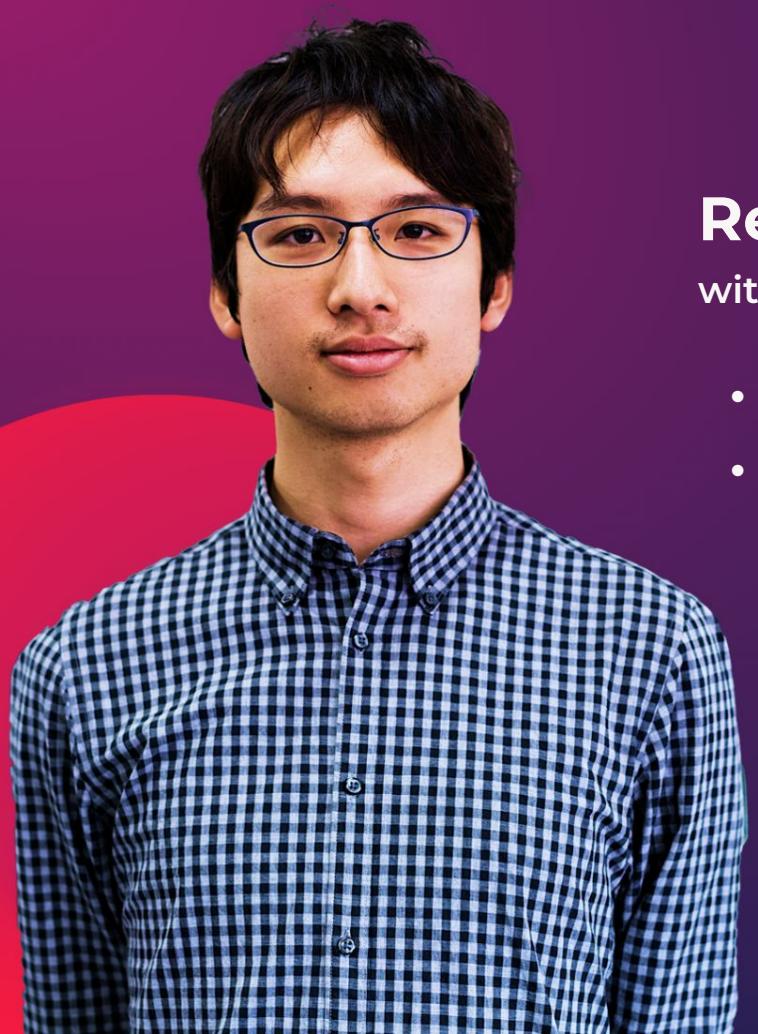
	i	↓ Impact | Urgency →	Low	Medium	High
1			Low	Medium	High
2		Low	1	3	6
3		Medium	2	4	8
4		High	5	7	9

Formula: Second MATCH

Second MATCH points to column labels

```
=INDEX({Entire table},
        MATCH([Row label]@row, {Row Labels}, 0),
              MATCH([Column label]@row, {Column Labels}, 0))
```

	↓ Impact | Urgency →	Low	Medium	High
1		Low	Medium	High
2	Low	1	3	6
3	Medium	2	4	8
4	High	5	7	9



Replacing VLOOKUP

with INDEX/MATCH/MATCH

- Commonly used in project management, as demonstrated in the PMO template set
- More flexible — columns can be rearranged without breaking the formula

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Setting up your source sheet

Row labels

	Project ID	Start Date	End Date	Responsible Dept	Planned Budget	Actual Spend	Budget Remaining
		Row Labels					
1		Start Date	End Date	Responsible Dept	Planned Budget	Actual Spend	Budget Remaining
2	Proj-001	04/03/23	11/17/23	Marketing	$10,000.00	$3,564.00	$6,436.00
3	Proj-002	05/01/23	05/26/23	Design	$3,000.00	$2,984.00	$16.00
4	Proj-003	06/19/23	01/31/24	Engineering	$16,400.00	$6,577.00	$9,823.00
5	Proj-004	04/06/23	05/24/23	Marketing	$35,000.00	$38,250.00	-$3,250.00
6	Proj-005	05/08/23	05/23/23	Marketing	$12,000.00	$11,958.00	$42.00
7	Proj-006	06/09/23	07/09/23	Engineering	$21,000.00	$21,052.00	-$52.00

Setting up your source sheet

Column labels

Why do we need to enter the column name in a row?

	Project ID	Start Date	End Date	Responsible Dept	Planned Budget	Actual Spend	Budget Remaining
		Column Labels					
1		Start Date	End Date	Responsible Dept	Planned Budget	Actual Spend	Budget Remaining
2	Proj-001	04/03/23	11/17/23	Marketing	$10,000.00	$3,564.00	$6,436.00
3	Proj-002	05/01/23	05/26/23	Design	$3,000.00	$2,984.00	$16.00
4	Proj-003	06/19/23	01/31/24	Engineering	$16,400.00	$6,577.00	$9,823.00
5	Proj-004	04/06/23	05/24/23	Marketing	$35,000.00	$38,250.00	-$3,250.00
6	Proj-005	05/08/23	05/23/23	Marketing	$12,000.00	$11,958.00	$42.00
7	Proj-006	06/09/23	07/09/23	Engineering	$21,000.00	$21,052.00	-$52.00

Setting up your destination sheet

One column for row labels (Project ID)

One (locked) row for column labels

	Project ID	Start Date	End Date	Responsible Dept	Planned Budget	Budget Remaining	Actual Spend
1		Start Date	End Date	Responsible Dept	Planned Budget	Budget Remaining	Actual Spend
2	Proj-001	04/03/23	11/17/23	Marketing	$10,000.00	$6,436.00	$3,564.00

Formula: INDEX

INDEX range points to entire table

=INDEX({Entire Table},

	Project ID	Start Date	End Date	Responsible Dept	Planned Budget	Actual Spend	Budget Remaining
1		**Start Date**	**End Date**	**Responsible Dept**	**Planned Budget**	**Actual Spend**	**Budget Remaining**
2	Proj-001	04/03/23	11/17/23	Marketing	$10,000.00	$3,564.00	$6,436.00
3	Proj-002	05/01/23	05/26/23	Design	$3,000.00	$2,984.00	$16.00
4	Proj-003	06/19/23	01/31/24	Engineering	$16,400.00	$6,577.00	$9,823.00
5	Proj-004	04/06/23	05/24/23	Marketing	$35,000.00	$38,250.00	-$3,250.00
6	Proj-005	05/08/23	05/23/23	Marketing	$12,000.00	$11,958.00	$42.00
7	Proj-006	06/09/23	07/09/23	Engineering	$21,000.00	$21,052.00	-$52.00

Formula: First MATCH

First MATCH points to row labels

```
=INDEX({Entire Table},
        MATCH($[Row label]@row, {Row Labels}, 0),
```

	Project ID	Start Date	End Date	Responsible Dept	Planned Budget	Actual Spend	Budget Remaining
1		Start Date	End Date	Responsible Dept	Planned Budget	Actual Spend	Budget Remaining
2	Proj-001	04/03/23	11/17/23	Marketing	$10,000.00	$3,564.00	$6,436.00
3	Proj-002	05/01/23	05/26/23	Design	$3,000.00	$2,984.00	$16.00
4	Proj-003	06/19/23	01/31/24	Engineering	$16,400.00	$6,577.00	$9,823.00
5	Proj-004	04/06/23	05/24/23	Marketing	$35,000.00	$38,250.00	-$3,250.00
6	Proj-005	05/08/23	05/23/23	Marketing	$12,000.00	$11,958.00	$42.00
7	Proj-006	06/09/23	07/09/23	Engineering	$21,000.00	$21,052.00	-$52.00

Formula: Second MATCH

Second MATCH points to column labels

```
=INDEX({Entire Table},
        MATCH($[Row label]@row, {Row Labels}, 0),
              MATCH([Column Name]1, {Column Labels}, 0))
```

	Project ID	Start Date	End Date	Responsible Dept	Planned Budget	Actual Spend	Budget Remaining
1		**Start Date**	**End Date**	**Responsible Dept**	**Planned Budget**	**Actual Spend**	**Budget Remaining**
2	Proj-001	04/03/23	11/17/23	Marketing	$10,000.00	$3,564.00	$6,436.00
3	Proj-002	05/01/23	05/26/23	Design	$3,000.00	$2,984.00	$16.00
4	Proj-003	06/19/23	01/31/24	Engineering	$16,400.00	$6,577.00	$9,823.00
5	Proj-004	04/06/23	05/24/23	Marketing	$35,000.00	$38,250.00	-$3,250.00
6	Proj-005	05/08/23	05/23/23	Marketing	$12,000.00	$11,958.00	$42.00
7	Proj-006	06/09/23	07/09/23	Engineering	$21,000.00	$21,052.00	-$52.00

Result

User enters a row label (Project ID), and based on the column labels, data from the source sheet is displayed.

	Project ID	Responsible Dept	Start Date	End Date	Actual Spend	Budget Remaining	Planned Budget
1		Responsible Dept	Start Date	End Date	Actual Spend	Budget Remaining	Planned Budget
2	Proj-001	Marketing	04/03/23	11/17/23	$3,564.00	$6,436.00	$10,000.00

Learning objectives: Recap

What did we learn?

MATCH with multiple columns

1. How MATCH locates search values in the range
2. How a range including multiple columns affects the result of MATCH
3. How to modify the output of MATCH in these scenarios to determine a row number

INDEX/MATCH/MATCH

1. Understand how INDEX/MATCH/MATCH locates values based on rows and columns
2. Learn how and why to use INDEX/MATCH/MATCH to replace a VLOOKUP

Next steps...

- Build an INDEX/MATCH formula using multiple columns
- Replace any and all VLOOKUPS with INDEX/MATCH or INDEX/MATCH/MATCH
- Come talk to us at the Formulas booth or book a ProDesk session if you have questions

Take the survey

We'd love to hear your thoughts on the session.

Open this session in the mobile app, click "Survey," and answer two questions — it's that easy!

Thank you.

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Result

User selects an Impact (row label) and Urgency (column label), and the Priority Score is returned automatically.

Project ID	Impact	Urgency	Priority Score
PRJ-001	Low	Low	=INDEX({Entire Table}, MATCH(Impact@row, {Impact (Row Labels)}, 0), MATCH(Urgency@row, {Urgency (Column Labels)}, 0))
PRJ-002	Medium	Medium	
PRJ-003	Low	High	6
PRJ-004	Medium	Low	2
PRJ-005	Medium	High	8
PRJ-006	High	Medium	7
PRJ-007	Low	Medium	3
PRJ-008	High	Low	5
PRJ-009	High	High	9

VLOOKUP

In a VLOOKUP formula, you are required to provide a column number

	Project ID Lookup	Responsible Dept Col 2	Start Date Col 3	End Date Col 4	Planned Budget Col 5
1		Responsible Dept	Start Date	End Date	Planned Budget
2	Proj-001	Marketing	04/03/23	11/17/23	$10,000.00
3	Proj-002	Design	05/01/23	05/26/23	$3,000.00
4	Proj-003	Engineering	06/19/23	01/31/24	$16,400.00
5	Proj-004	Marketing	04/06/23	05/24/23	$35,000.00
6	Proj-005	Marketing	05/08/23	05/23/23	$12,000.00

VLOOKUP

But what happens when we rearrange the columns in the source sheet?

	Project ID Lookup	Responsible Dept	Start Date	End Date	Planned Budget Column number
1	Proj-001	=VLOOKUP($[Project ID]@row, {Entire Source Table}, 2, false)			0000
2					

	Project ID Lookup	Responsible Dept Col 2	Start Date Col 3	End Date Col 4	Planned Budget Col 5
1		Responsible Dept	Start Date	End Date	Planned Budget
2	Proj-001	Marketing	04/03/23	11/17/23	$10,000.00
3	Proj-002	Design	05/01/23	05/26/23	$3,000.00
4	Proj-003	Engineering	06/19/23	01/31/24	$16,400.00
5	Proj-004	Marketing	04/06/23	05/24/23	$35,000.00
6	Proj-005	Marketing	05/08/23	05/23/23	$12,000.00

VLOOKUP

But what happens when we rearrange the columns in the source sheet?

	Project ID	Responsible Dept	Start Date	End Date	Planned Budget
		Error	Incorrect values		
1	Proj-001	#INVALID COLUMN	11/17/23	Marketing	$10,000.00
2					

	Project ID Lookup	Start Date Col 2	End Date Col 3	Responsible Dept Col 4	Planned Budget Col 5
1		Start Date	End Date	Responsible Dept	Planned Budget
2	Proj-001	04/03/23	11/17/23	Marketing	$10,000.00
3	Proj-002	05/01/23	05/26/23	Design	$3,000.00
4	Proj-003	06/19/23	01/31/24	Engineering	$16,400.00
5	Proj-004	04/06/23	05/24/23	Marketing	$35,000.00
6	Proj-005	05/08/23	05/23/23	Marketing	$12,000.00