

L^AT_EX: Online module 5

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Topics to be covered

- Tables
- Rows spanning multiple columns
- Columns spanning multiple rows
- Examples
- Exercises

Tables

- Tabular environment can be used to create simple tables
- Tables start and end with the following commands:

```
\begin{tabular}
```

...

```
\end{tabular}
```

- All the tables are constructed in terms of rows

Example 1

```
\begin{tabular}{ccc}
  Column1 Name & Column2 Name & Column3 Name \\
  $Content1$ & Content2 & Content3 \\
  $Content4$ & Content5 & Content6 \\
  $Content7$ & Content8 & Content9 \\
  $\vdots$ & & $\vdots$ \\
\end{tabular}
```

contd...

- Here is the output of code from the previous slide:

Column1 Name	Column2 Name	Column3 Name
Content1	Content2	Content3
Content4	Content5	Content6
Content7	Content8	Content9
⋮	⋮	⋮

contd...

- `{ccc}`: Aligns the columns and tells the number of columns in a table. In this example, table has 3 columns
- Remember that columns can be aligned either to the left `{l}`, right `{r}` or can be centered `{c}`
- Each row must end with `\\`
- There should be an ampersand `&` between the contents of any row

contd...

If you want the rows and columns to be separated by horizontal and vertical lines, use the following commands:

- `\hline`: Draws a horizontal line after each and every row
- `{|c|c|c|}`: Draws a vertical line after each and every column

Example 2

```
\begin{tabular}{|c|c|c|}
  \hline
  Column1 Name & Column2 Name & Column3 Name\\\hline
  Content1 & Content2 & Content3 \\\hline
  Content4 & Content5 & Content6 \\\hline
  Content7 & Content8 & Content9 \\\hline
  $\vdots$      & $\vdots$    & $\vdots$  \\\
  \hline
\end{tabular}
```


contd...

- Here is the output of code from the previous slide:

Column1 Name	Column2 Name	Column3 Name
Content1	Content2	Content3
Content4	Content5	Content6
Content7	Content8	Content9
⋮	⋮	⋮

Example 3

Here is another example that separates columns with double lines and using a different font for the column names:

```
\begin{tabular}{|c||c||c|}
\hline
{\it Column1 Name} & {\it Column2 Name} & {\it Column3 Name}
\\ \hline \hline
$Content4$ & Content5 & Content6 \\ \hline
$Content7$ & Content8 & Content9 \\ \hline
$\vdots$ & & $\vdots$ \\ \hline
\end{tabular}
```

contd...

- Here is the output of code from the previous slide:

<i>Column1 Name</i>	<i>Column2 Name</i>	<i>Column3 Name</i>
Content1	Content2	Content3
Content4	Content5	Content6
Content7	Content8	Content9
⋮	⋮	⋮

Example 4

Here is another example that separates rows and also columns with double lines, say, A and B are two players and we have to represent them in a table.

```
\begin{tabular}{|c||c|c|}  
\hline  
& {\it A} & {\it B}  
\hline  
$A$ & Value1 & Value4 \hline  
$B$ & Value2 & Value3 \hline  
\hline  
\end{tabular}
```

contd...

- Here is the output of code from the previous slide:

	<i>A</i>	<i>B</i>
<i>A</i>	Value1	Value4
<i>B</i>	Value2	Value3

More options

Braces preceded by the command `\begin{tabular}` can have the following options:

- `{l}`: Generates a column format whose contents are left justified
- `{r}`: Generates a column format whose contents are right justified
- `{c}`: Generates a column format whose contents are centered (all of the above examples have this option)
- `p{width}`: You can specify left justified column of width p
- If you want more spacing between two rows, then use the command `[4pt]` immediately after the double backslash command (4 points of blank space is used to separate two rows)

Example 5

Here is another example that demonstrates on defining 6.5 cm width to a column:

```
\begin{tabular}{ | l | p{6.5cm} | }
\hline
Department & Description \\ \hline
Applied Mathematics & The Department of Applied
Mathematics was founded in 1967 and is one of five
academic units in the Faculty of Mathematics \\ \hline
Pure Mathematics & Mathematics is both an art and
a science, and Pure Mathematics lies at its heart.
Pure Mathematics explores the boundary of
mathematics and pure reason. \\ \hline
\end{tabular}
```

contd...

- Here is the output of code from the previous slide:

Department	Description
Applied Mathematics	The Department of Applied Mathematics was founded in 1967 and is one of five academic units in the Faculty of Mathematics
Pure Mathematics	Mathematics is both an art and a science, and Pure Mathematics lies at its heart. Pure Mathematics explores the boundary of mathematics and pure reason.

Rows spanning several columns

- Following command is used for generating rows that span several columns:
$$\backslash\text{multicolumn}\{NumberofColumns\}\{Justification\}\{Columncontents\}.$$
- Justification can include left, right or centered
- Text in the columns can also be wrapped by using the width command

Example 6

The following example demonstrates using multi column command:

```
\begin{tabular}{|l||l||l|}
\hline
\multicolumn{3}{|c|}{University of Waterloo} \\
\hline
Faculty of Mathematics & Faculty of Sciences & Faculty of
Engr. \\
\hline
Applied Mathematics & Bioscience & Mechanical \\
Pure Mathematics & Physics & Electrical \\
Computer Science & Chemistry & Civil \\
\hline
\end{tabular}
```

contd...

- Here is the output of code from the previous slide:

University of Waterloo		
Faculty of Mathematics	Faculty of Sciences	Faculty of Engr.
Applied Mathematics	Bioscience	Mechanical
Pure Mathematics	Physics	Electrical
Computer Science	Chemistry	Civil

Columns spanning several rows

- Use the following package in your preamble: `\usepackage{multirow}`
- Following command is used for generating columns that span several rows:
`\multirow{Numberofrows}{Justification}{Rowcontents}`.
- Justification can include left, right or centered
- Text in the rows can also be wrapped by using the width command
- If you want to draw a horizontal line from column i to column j inclusive, then use the following command: `\cline{i-j}`

Example 7

The following example demonstrates using multi row command:

```
\begin{tabular}{|1||1||1|}  
\hline  
\multicolumn{3}{|c|}{University of Waterloo} \\  
\hline  
Faculty A & Faculty of Mathematics & Faculty of Sciences  
\ \hline\hline  
\multirow{4}{*}{Has only one department} & Applied  
Mathematics & Biology \\ \cline{2-3}  
& Pure Mathematics & Physics \\ \cline{2-3}  
& Computer Science & Chemistry \\ \hline  
\end{tabular}
```

contd...

- Here is the output of code from the previous slide:

University of Waterloo		
Faculty A	Faculty of Mathematics	Faculty of Sciences
Has only one department	Applied Mathematics	Biology
	Pure Mathematics	Physics
	Computer Science	Chemistry

- Note: You can generate any number of columns spanning multi rows and rows spanning multi columns.

Exercise 1

Try to generate the following table:

<i>Departments</i>	<i>Number of faculty members</i>	<i>Number of students</i>
Dept.1	100	45
Dept.2	75	30
Dept.3	60	20

- Repeat the same exercise and generate horizontal lines between rows and vertical lines between columns

Exercise 2

Try to generate the following table on multi rows:

Courses offered	Dept. B	Dept. C
First year courses	Course1	Course2
	Course3	Course4
	Course5	Course6
Second year courses	Course1	Course2
	Course3	Course4
	Course5	Course6
Third year courses	Course1	Course2
	Course3	Course4
	Course5	Course6

Exercise 3

Try to generate the following table on multi rows with wrapping text and double lines:

Courses offered	Dept. B
Applied Mathematics department	The Department of Applied Mathematics was founded in 1967 and is one of five academic units in the Faculty of Mathematics
	Course offered: Advanced Applied Math
Pure Mathematics department	Pure Mathematics explores the boundary of mathematics and pure reason.
	Course offered: Abstract Math