MATLAB

Class 2: Basics part 2

Sets


All I want for Christmas is you
Joy to the world
Open arms
My all
Forever
Make it happen
Vision of love
We belong together
Emotions
Honey
Always be my baby
Obsessed
Fantasy
Shake it off
Jason
Kevin

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Set operations

Ismember — checks is element is inside set

Setdiff — looks for the elements not unique to both sets

Intersect — returns the elements unique to both sets

Union — joins two sets

Data Structures

Tables

Matrix that can hold **DIFFERENT** types

Structs

Object with fields used in object-oriented programing

Cells

Container that can hold **ANY** information

Tables

Stores information in a neat fashion of different types, much like an excel sheet or a dataframe in R

- Useful when you have a matrix but need to store info of different types
- Cannot do matrix math on these
- Each column will contain info of the SAME type

Structs

Object that contains several fields: i.e., a student has a

- Student.name
- Student.age
- Student.GPA
- Student.FavMariahSong
- Student.Thesis

Cells

The most flexible of data structures in MATLAB

Holds any information you'd like in a cell

- Indexable with same rules of matrices c{1,2}
- Can contain different types in each cell regardless of its neighbours (i.e., columns and rows)

Cells

Indexing a cell array is a lot like a regular array

Yet there is a key difference between c(1,2) and c{1,2}

The latter indexes the **contents** of the cell, the former indexes the **cell** itself

Note: you can index an array after indexing a cell c{1,1}(1)

Cell Operators

To help visualize your cell structure and the contents it holds use **cellpoIt()**

You can also convert between cells, structs, matrices, etc given that data conversion is possible

Cell FUN

Applies a function to each cell of a cell array, very useful tool when working with data of different lengths

cellfun(function, cellarray)

Conditionals and flow of logic

Sometimes we want something to happen only **IF** a criterion is true or a specific **CASE** is met

For example: we only want to include subjects **IF** their Ids are odd

we only want to warn users in **CASE** of an error

REMINDER: Boolean Operators

How can we ask the computer a question:

- Is equal to ==
- Is greater than >
- Is less than <
- Is NOT equal to ~=
- The OR operator ||
- The AND operator &&

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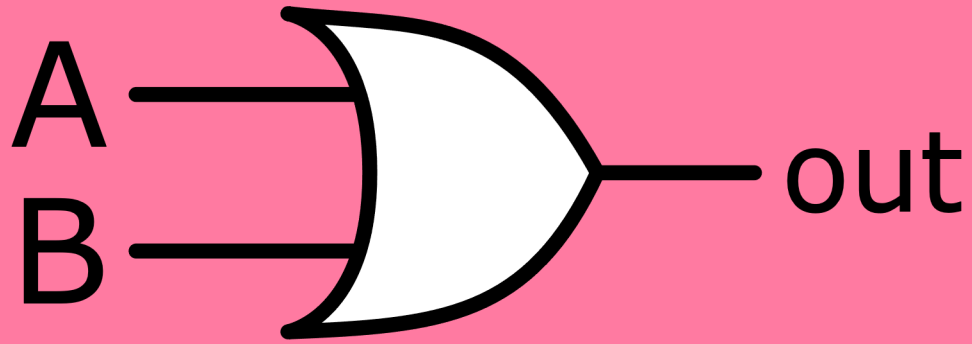
Boolean Operators

Two very special operators: **AND** and **OR**



Boolean Operators

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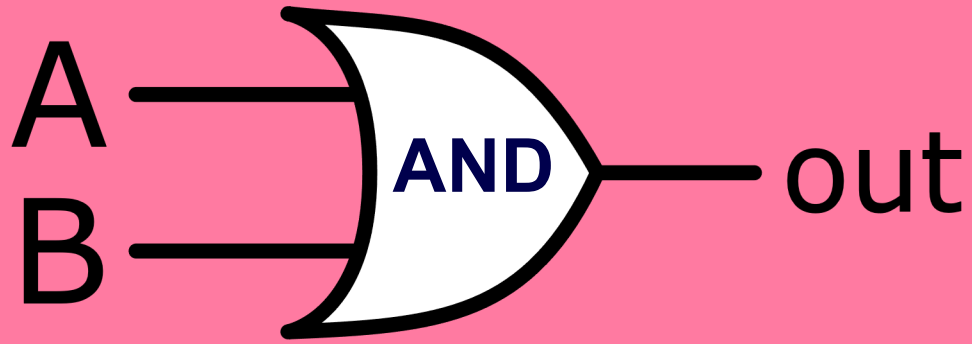

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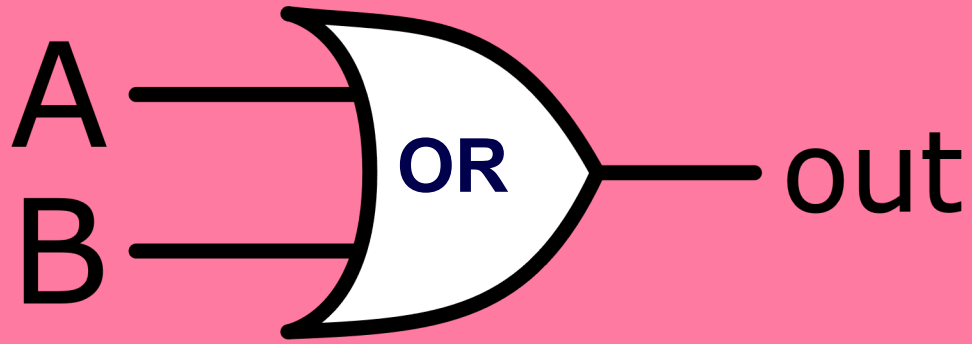
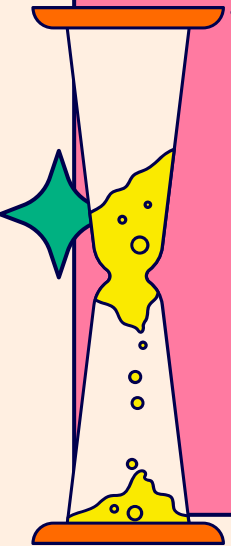


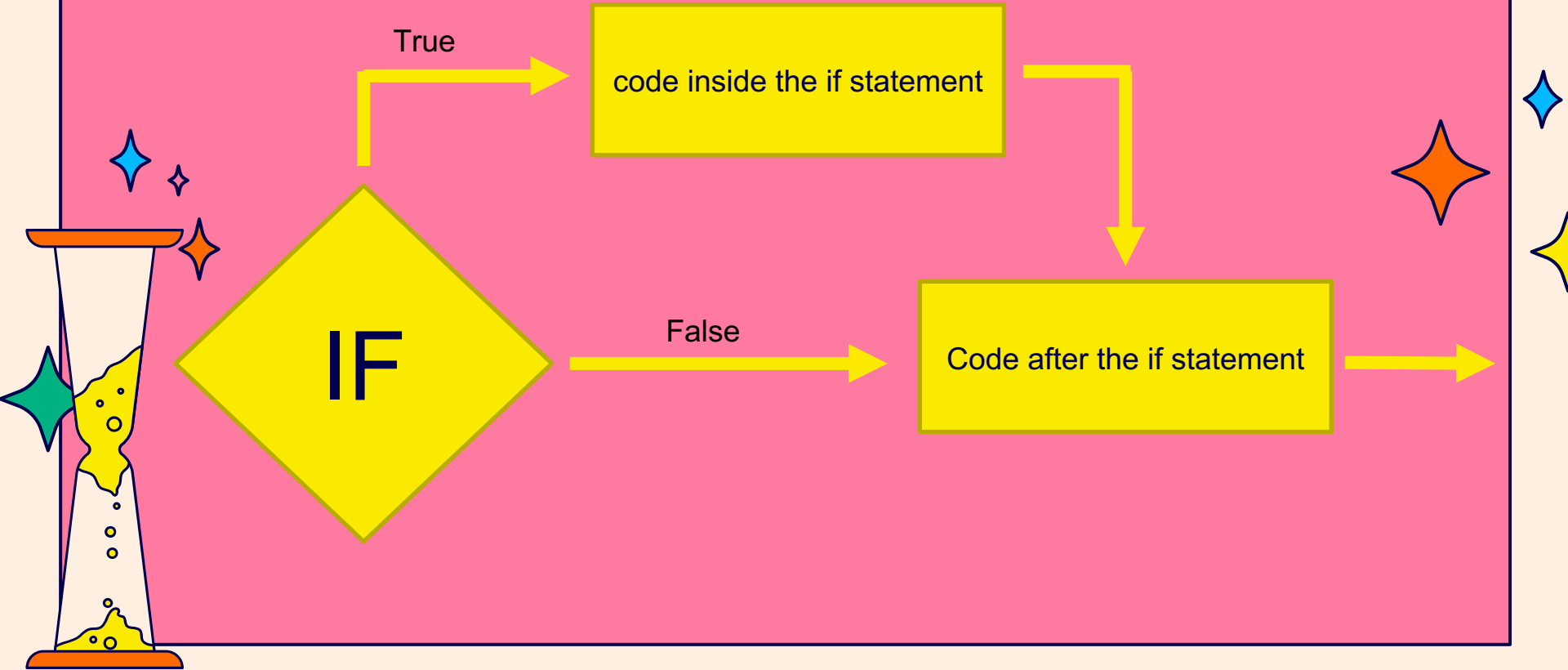
IF & SWITCH statement

These are the gate keepers/ decision makers of your code

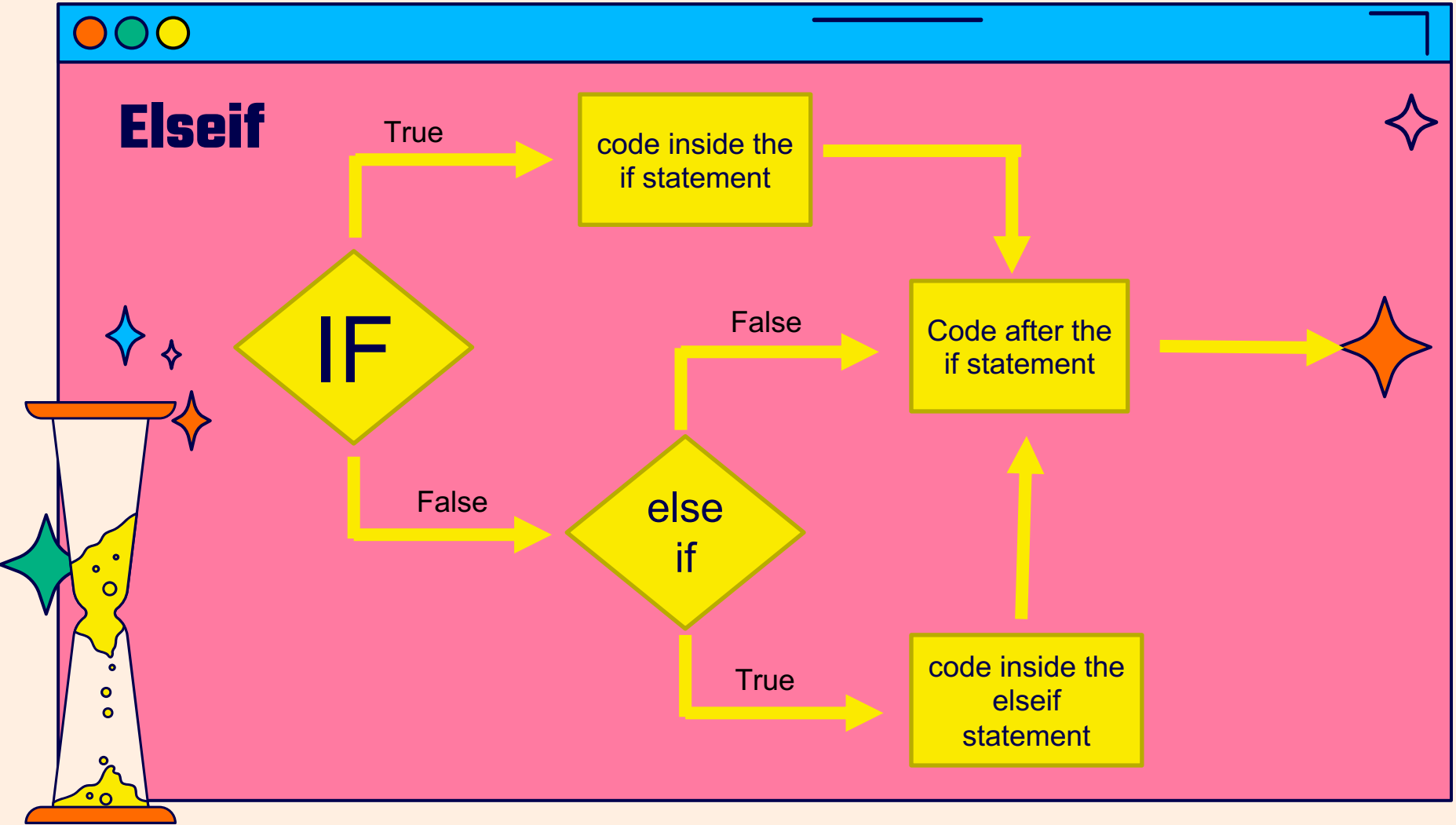
These functions allow you to branch your code depending on conditions



IF & SWITCH statement



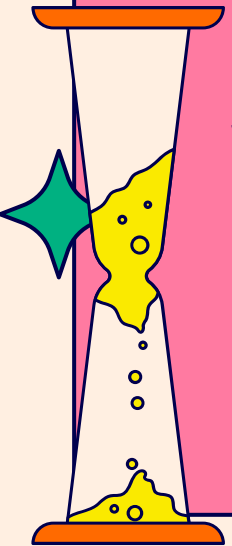
Elseif


True
code inside the if statement
IF
False
Code after the if statement
False
else if
True
code inside the elseif statement

SWITCH statement

Useful when there are a finite number of acceptable inputs that you want to check the value of

Works exactly like an if but with cases, if a **case** is not met you move on to the next



LOOPS

We also might want to repeat lines of code several times

Instead of copying and pasting code 100 times we can use loops

For LOOPS

```
For  variable_name = values to iterate over

    Do STUFF in here……

end
```

While LOOPS

```
while          conditional statement

    Do STUFF in here……

end
```

While LOOPS

While LOOPS

```
while    conditional statement

    Do STUFF in here……

end
```

While LOOPS

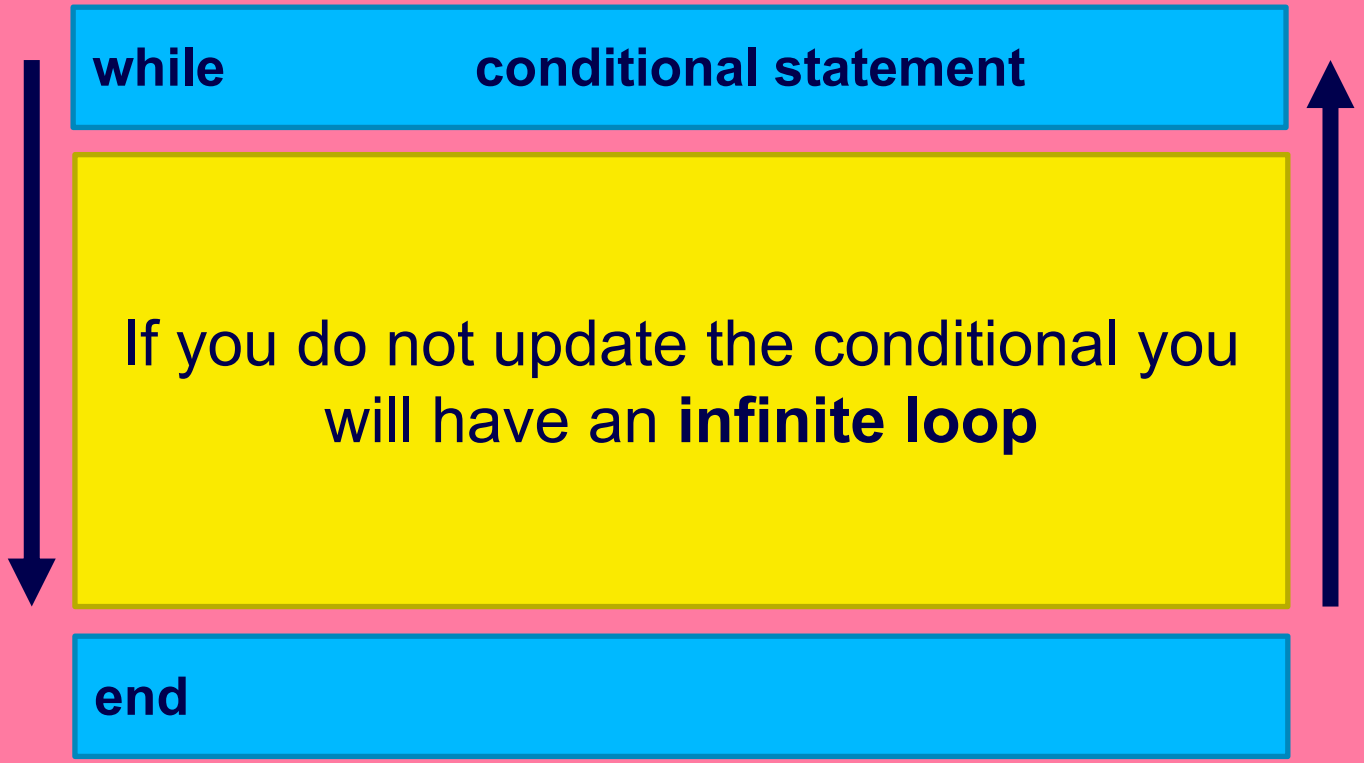
While LOOPS

while **conditional statement**

Remember you need to update the value of the conditional such that it will terminate after a given point

end

While LOOPS


while conditional statement
If you do not update the conditional you will have an **infinite loop**
end

Try catch

Statements that control the flow of the code very useful when debugging or trying to ‘foolproof’ your code

Will try an assignment or function call and return an error. Does not stop the execution of your code!