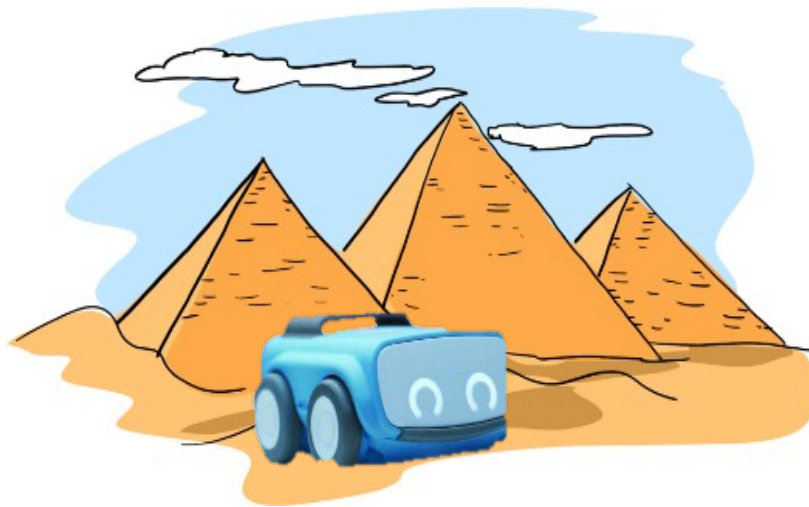
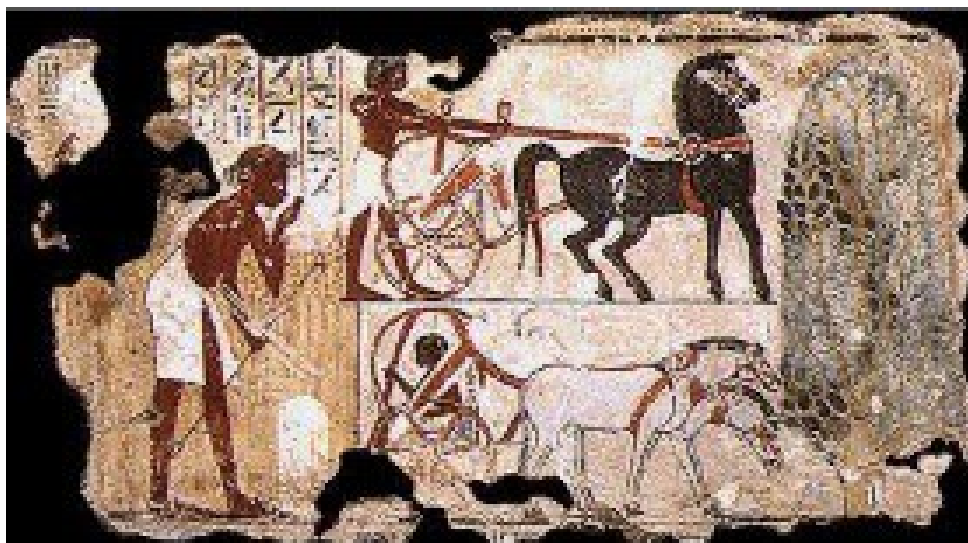


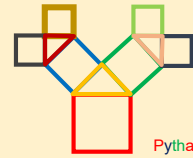
## Reminder of GEOMETRY to properly use indi™



*But first, a little history.....*

*The origins of geometry are attributed to the repeated flooding of the Nile. It forced the Egyptian surveyors to regularly retrace the boundaries of agricultural properties, and this 2000 years before our era. That is why the word Geometry comes from the Greek γῆ (gê) "land" and μέτρον (metron) "measure".*





## SUMMARY

### A The angles

#### 1 – Definition (page 4)

#### 2 – The different types of angles (page 4)

#### 3 – How to measure angles (page 5)

#### 4 - How does indi work (page 5)

#### 5 – Programming of the directions (page 6)

#### 6 – Examples of path programming (page 9)

### B Polygons

#### 1 – Definition (page 11)

#### 2 – Special polygons

#### a) triangles (page 11)

#### b) quadrangles (page 13)

#### Appendix (page 15)

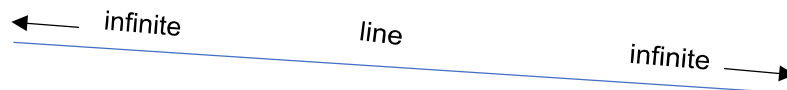
Direction indicator to cut out



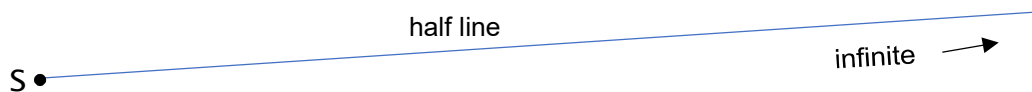
## A - ANGLES *(from the Latin "angulus" meaning "corner", itself coming from the Greek agko "αγκω")*

### Preliminaries: line, half-line, and line segment - definitions

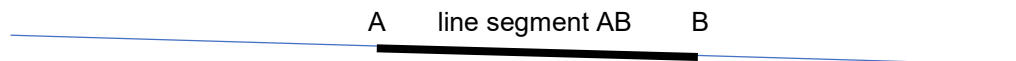
- A **line** is infinite in both directions:



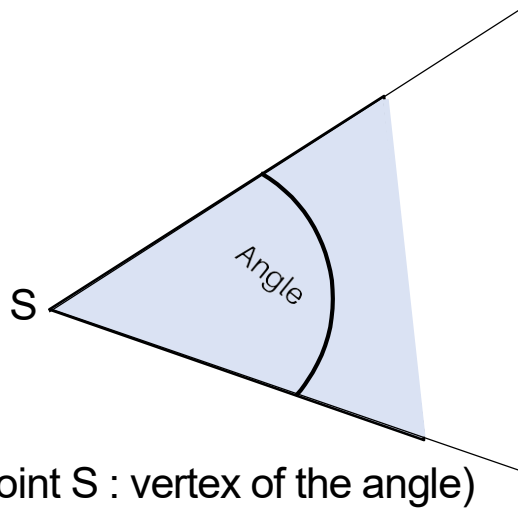
- A **half line** comes from a point (here the point S) and is infinite only in 1 direction



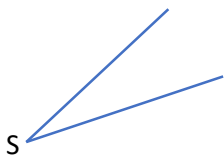
- A **line segment** is the portion of a line bounded by two points (here A and B) called the ends of the segment



1 - Definition: an angle is the portion of the plane between two half-lines coming from the same point (point S in the figure below) named the vertex of the angle

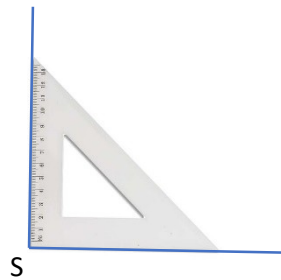


## 2 - The different types of angles



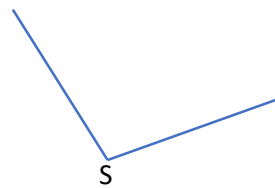
### Acute Angle

An acute angle is an angle smaller than a right angle



### Right Angle

The sides of a right angle are perpendicular as shown by the square



### Obtuse Angle

An obtuse angle is an angle larger than a right angle

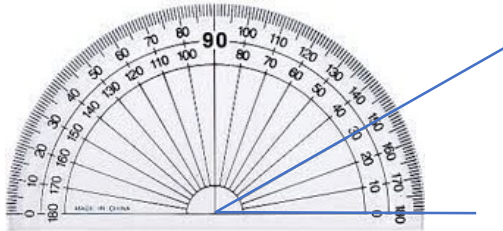


### Straight Angle

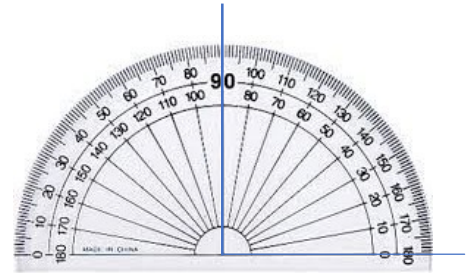
The straight angle is equal to twice the right angle.



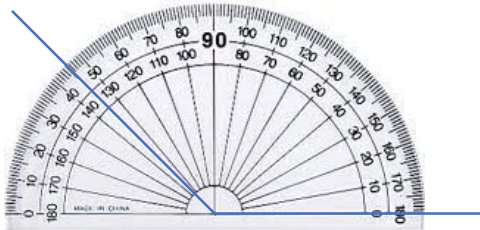
3- How to measure angles? Angles can be measured with a "protractor". The unit of measurement is the degree, designated by the symbol "°".



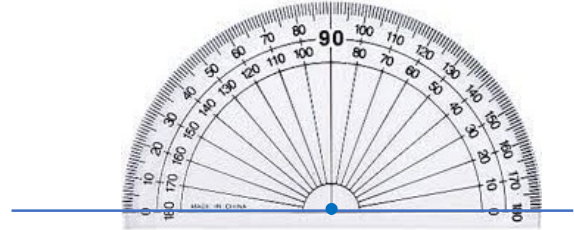
This particular Acute Angle measures 30° as indicated by the protractor above.



A Right Angle measures 90° as indicated by the protractor above.

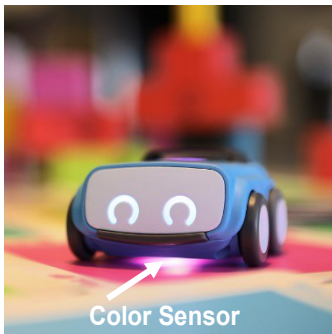


This particular Obtuse Angle measures 135° as indicated by the protractor above.



A Straight Angle measures 180° as indicated by the protractor above.

4 - Indi® has a color sensor underneath it, an "eye". Thanks to this sensor, Indi®, while rolling on a card, recognizes its color and this for each of the 8 cards that are provided. It can thus execute the commands (direction, movement, light, sound) associated with the color of the card on which it rolls.



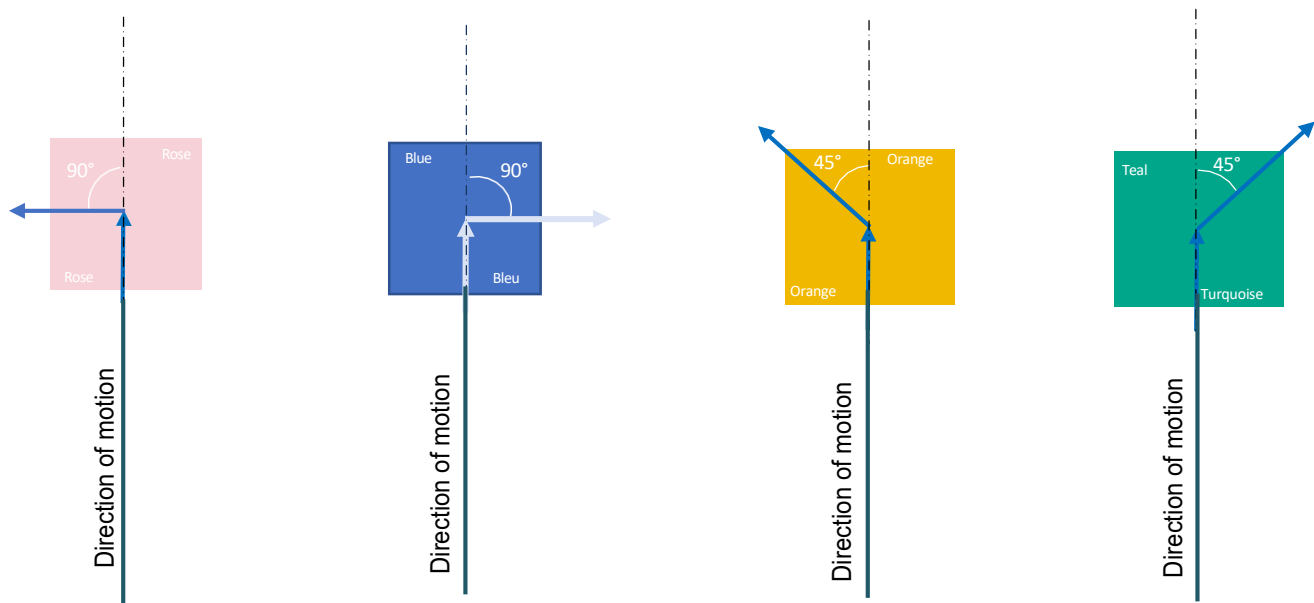
Here are the cards (30 in total) of 8 colors, their number per color, and the command associated with each color by default:

<b>X 5</b>	<b>X 4</b>	<b>X 3</b>	<b>X 2</b>	<b>X 5</b>	<b>X 5</b>	<b>X 3</b>	<b>X 3</b>
<b>Green</b>	<b>Yellow</b>	<b>Red</b>	<b>Purple</b>	<b>Pink</b>	<b>Blue</b>	<b>Orange</b>	<b>Teal</b>
Go, go faster	Slow down	Stop	Celebrate !	Turn 90° Left	Turn 90° right	Turn 45° Left	Turn 45° right
← Motions Control →				← Directions Control →			



## 5 -Default direction commands. Other possible commands with the app

Indi® loves to follow 90° and 45° angles. Here's how to program these direction changes, using the following color cards:



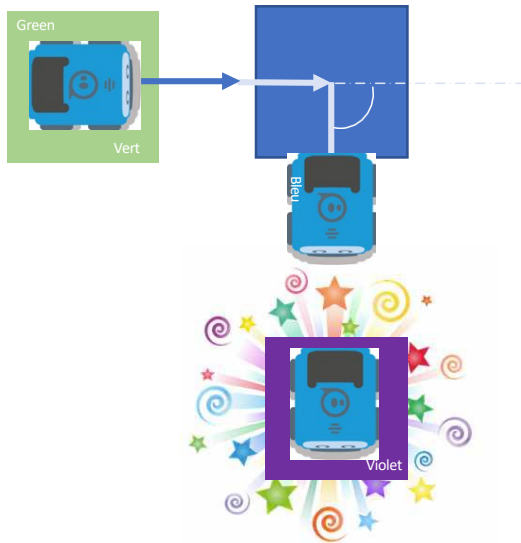
Once it is switched on (see the summary of the Beginners Guide to activate the switch) Indi starts exclusively when it is put on the green card. It then accelerates three times eagerly and goes in a hurry. If it doesn't pass on any cards along its way, it stops after one meter.

**Important:** the angles to be programmed must refer to the direction of motion of Indi

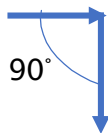


90° turn to the right:

Check that Indi is charged and then press its switch. Place Indi on the green card. Indi starts straight ahead, rolls on the blue card, makes a 90° angle to the right and arrives on the purple card. There, it celebrates its arrival and stops!

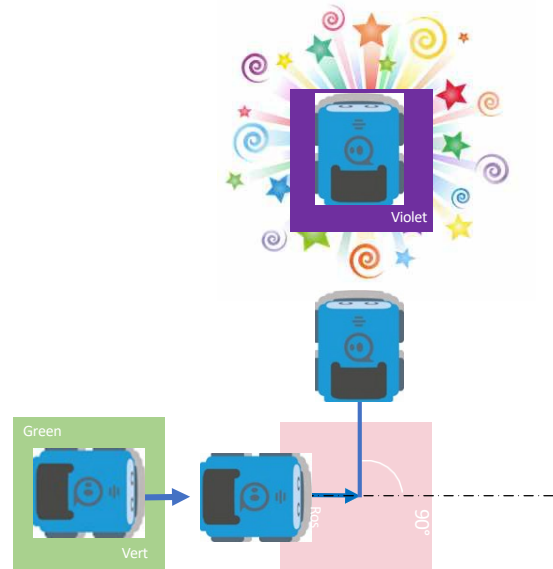


Indi has just gone through a 90° angle (also called a right angle), to the right :

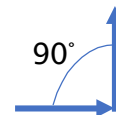


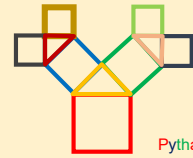
90° turn to the left:

Place Indi on the green card to start it. It starts straight ahead, rolls on the pink card, makes a 90° angle on the left and arrives on the purple card. There, it shows its joy then stops!



Indi has just gone through a 90° angle (also called a right angle), to the left :



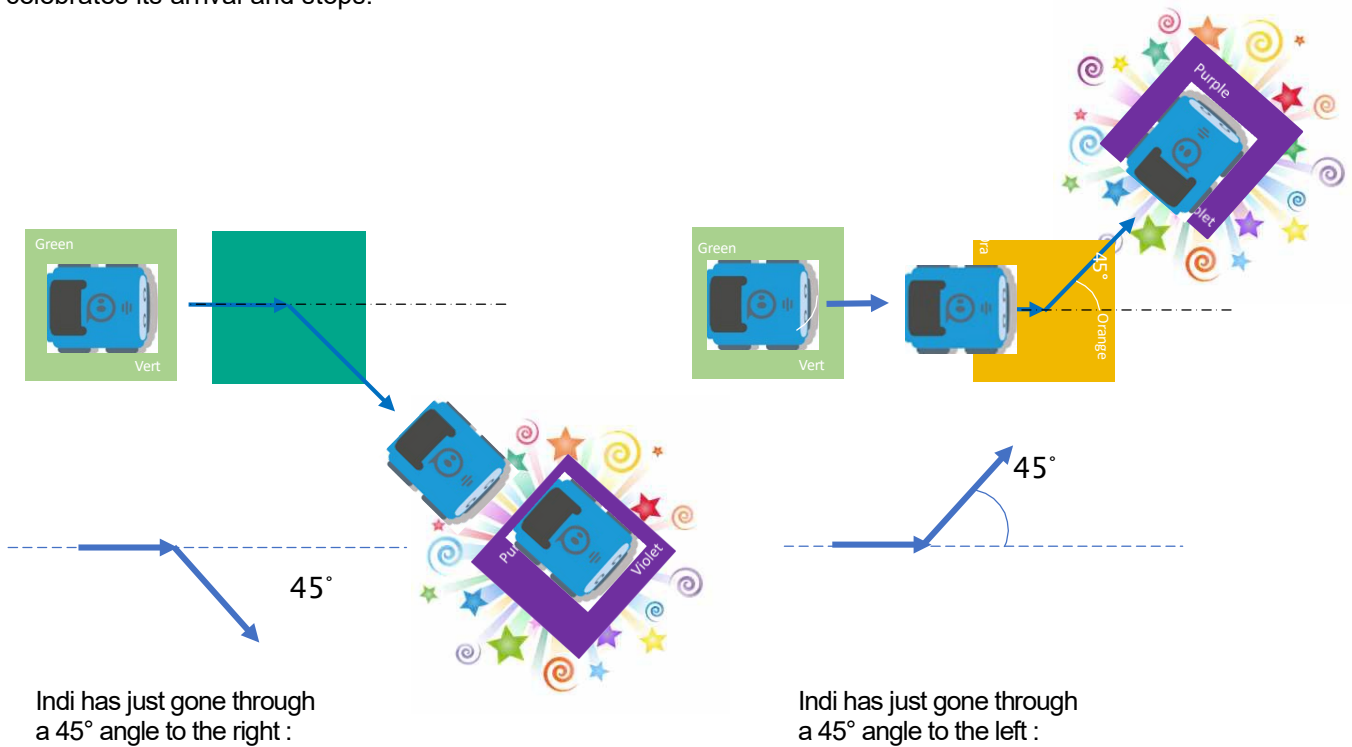


45° turn to the right:

Check that Indi is charged and then press its switch. Place Indi on the green card. Indi starts straight ahead, travels on the teal card, makes a 45° angle to the right and arrives on the purple card. There, it celebrates its arrival and stops!

45° turn to the left :

Place Indi on the green card. Indi starts straight ahead, travels on the orange card, makes a 45° angle to the left and arrives on the purple card. There, it celebrates its arrival and stops.



### Exercise:

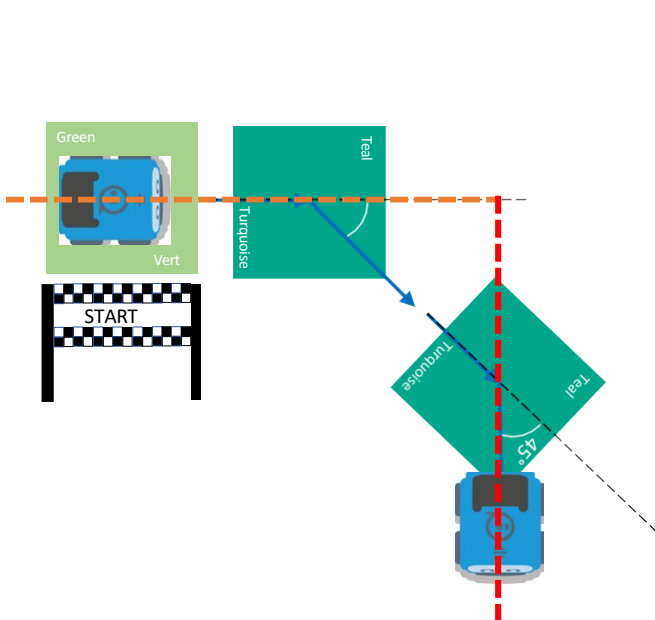
find the right card for indi to go in the right direction



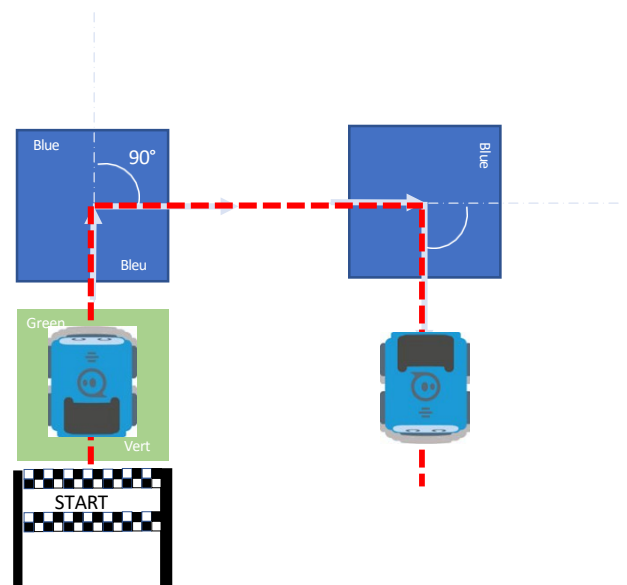


## 6- Examples of circuits

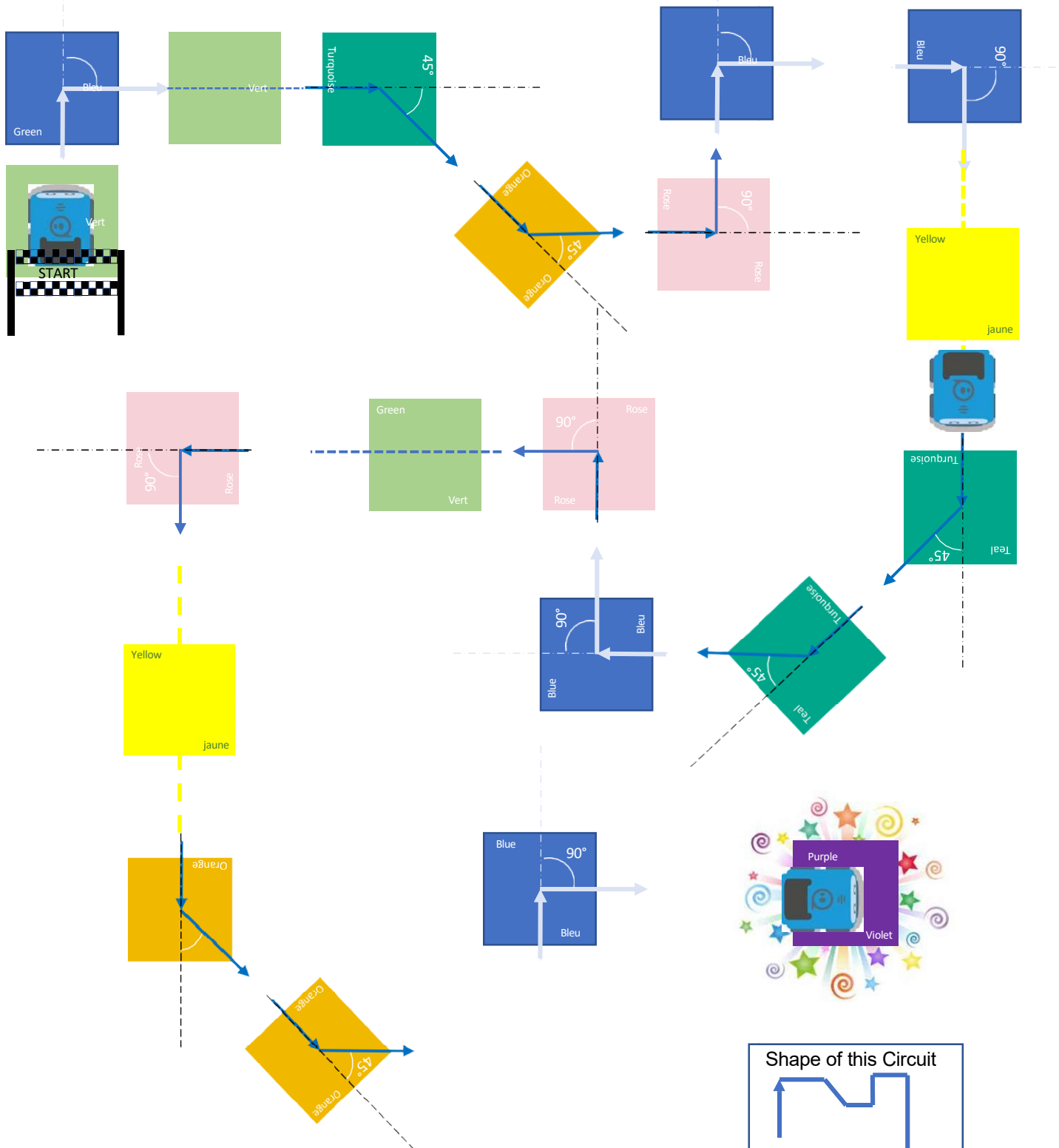
2 successive 45° turns make Indi turn 90°:



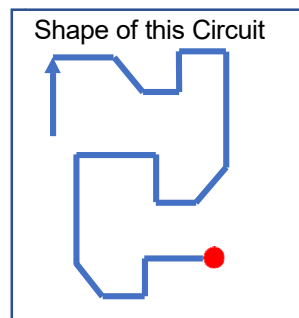
2 successive 90° turns make Indi turn around:



Example of a circuit with several consecutive angles:



You can imagine an infinite number of circuits.  
Activities and games are suggested in the Beginner's Guide.

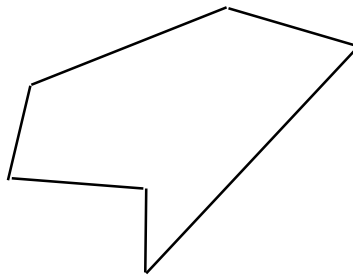


## B – POLYGONS *(from the Greek πολύς, polús « numerous » and from γωνία, gônia « angle »)*

### 1 - Definition

A Polygon is a flat closed shape bounded with straight sides.

Example :



### 2 - Particular polygons and their specific name

A Polygon is named on the basis of the number of sides it has.

- a) Triangle (polygon with 3 sides)
- b) Quadrilateral (polygon with 4 sides)
- c) Pentagon (5 sides)
- d) Hexagon (6 sides)
- e) Heptagon (7 sides)
- f) Octagon (8 sides)

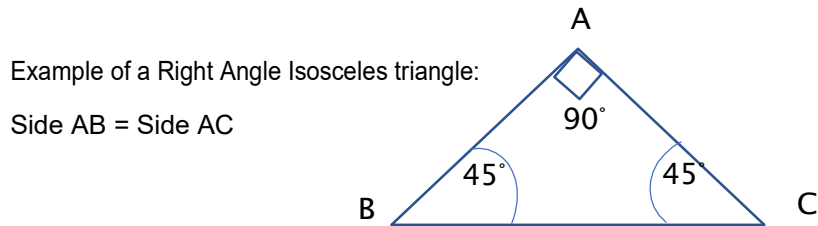
- a) Triangle (Etymology : from Latin triangulus i.e. three angles)

**Important property: the sum of the measures of the angles of a triangle is equal to 180°.**

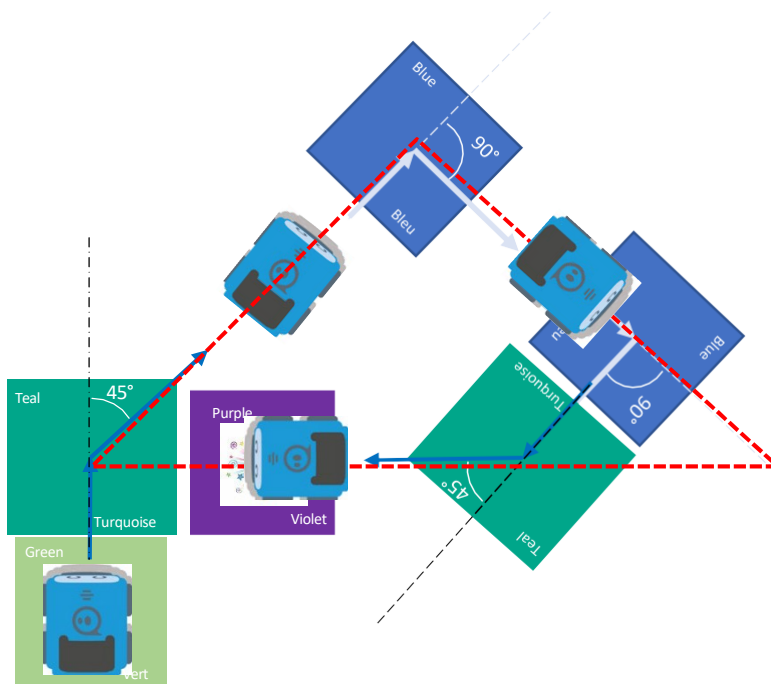
Definitions of 3 particular triangles:

- **Isosceles triangle:** An isosceles triangle is a triangle having **two sides of equal length** and **two equal angles**
- **Right Angle triangle:** is a type of triangle that has **one of its angles equal to 90 degrees**. The other two angles sum up to 90 degrees.
- **Right Angle Isosceles triangle:** is a **right triangle** that consists of **two equal length sides**. The other 2 angles are each **equal to 45°**.





Let's take Indi around an isosceles right-angled triangle (ahem, cheating a bit!):



**b) Quadrilaterals.**

The name « quadrilateral » is derived from the Latin words « quadri » which means four, and « latus », which means side.

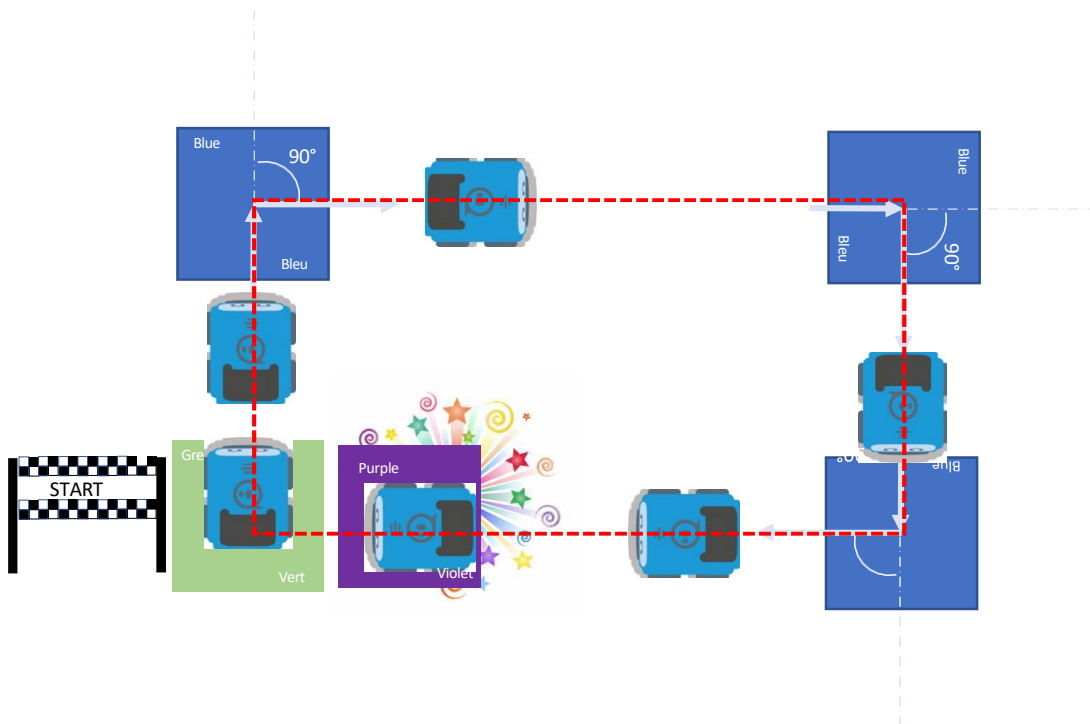
A quadrilateral is a polygon having **4 sides**, **4 angles**, **4 vertices**, and interior angles that add to **360° degrees**.

Definitions of 2 particular quadrilaterals:

**Square** : a square is a **regular polygon having four equal sides and equal angles that measure 90° each**.

**Rectangle** : a **four-sided** polygon that has **four right angles** and **each pair of opposite sides parallel and of the same length**.

Let's take Indi around a rectangle:



Other activities and games are available in the User Manual.



Then get started with block programming with the App.



## NOTES

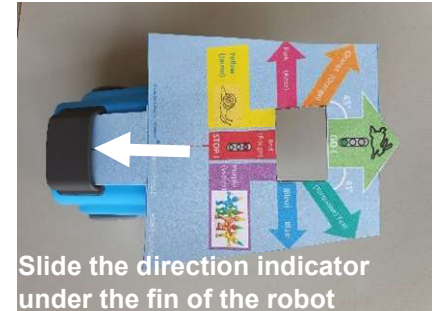
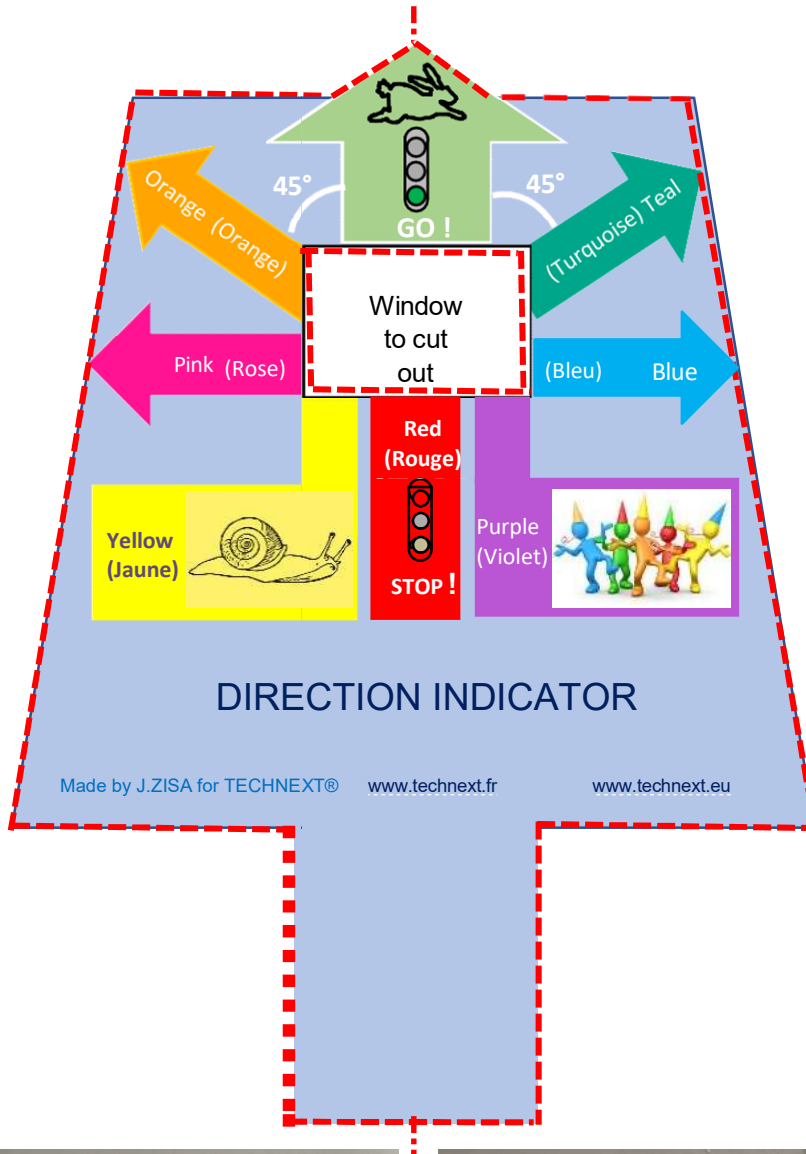


## ANNEX DIRECTION INDICATOR

Cut along the red dotted lines. — — — — —

Do not forget to cut out the window allowing you to see the color of the card on which the Direction Indicator will be positioned.

Then slide the direction indicator under the fin of the robot



Depending on the color of the card seen through the window of the Indicator, find on it the arrow of the same color. The selected arrow will indicate the direction to take (examples given with default color coding), or movements.

