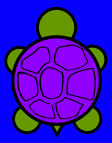


Purple Shell Challenge Cards

Teachers Notes:

This set of Challenge cards is designed to be used with the Blockly Turtle resources. The full collection of resources for teachers is found in the **Turtle** area on bebras.uk.

This set of cards is for pupils who have achieved their Purple Shell Programmer award and are now working towards their Blue award.

This set of cards and playground introduce some code blocks in a Maths folder. Please note that they are mainly numeracy blocks. The more mathematical blocks are saved until the Black Turtle Playground. While loops and some logic blocks are also new.

Preparation:

1. When the pupils login to their computers they should head to the ***Turtle Playground - Purple***. They should be directed to: bebras.uk -> Turtle -> click on the Purple turtle.
2. These cards should be printed out (size to:100% on A4 card, or "fill the paper" on A5 card) and laminated. Each pupil also needs their own Yellow Shell Record Card (which should not be laminated as they have to be written on). When a pupil completes a Challenge Card, its number can be written in their Record Card (in one of the clip boards).
3. In the first lesson, the teacher should show the students how to access ***Turtle Playground - Purple*** and the Introduction video on Card 0. Note ***Card 0*** is for the teacher to use with the class. Pupils can start with ***Card 1***.
4. Students should complete a minimum of 8 cards of the 16 provided, so some choice is available.

Purple Shell Challenge Cards

Code Blocks introduced in **Turtle Playground - *Purple***:

There is one new block in the ***Colour*** folder in the toolbox:

There are two new blocks in the ***Loops*** folder in the toolbox:

A new ***Logic*** folder containing these blocks:

A new ***Maths*** folder containing these blocks:

This Card is for teachers!

Purple Shell Challenge Cards

0

1. Show your pupils how to go to ***Turtle Playground - Purple***

2. Show your class the videos.
3. Provide each pupil who has achieved their Purple Shell award their new Record Card.
4. Distribute these Challenge Cards.

For the teacher of pupils working towards their Blue Shell Turtle Programmer award using Turtle Playground - Purple

Purple Shell Challenge Cards

1

Roll a dice and flip a coin

Challenge:

Using code blocks from the Text and Maths folders make and run this short program:

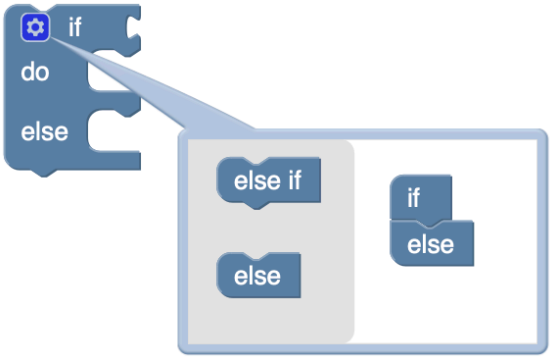
Extra:

Make a program that says: “Heads” or “Tails”.

Hint:

You will need to generate a random number between 1 and 2 and then use an *if … else* block to choose what to print in each case.

To do this select the *if* code block from the Logic menu. To make it an *if … else* block, click on the **cog** ( ) and drag in an *else*. Click on the cog again to close this menu when you are done:



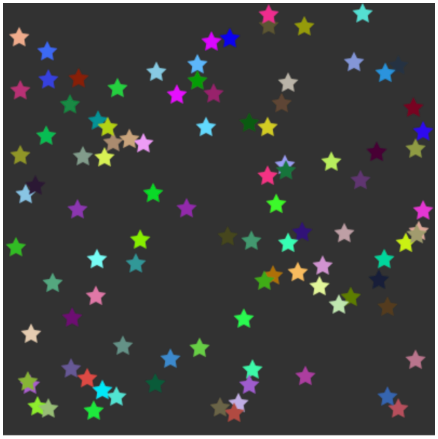
Purple Shell Challenge Cards

2

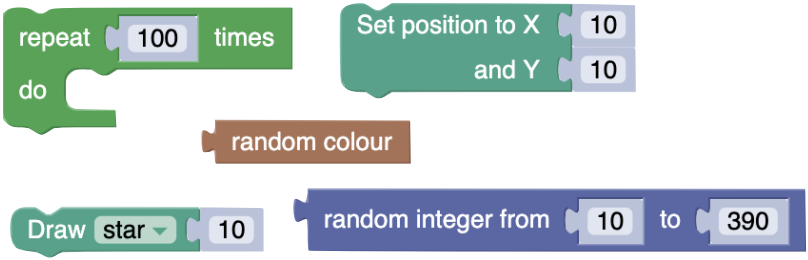
100 random stars

Challenge:

Write a program to draw a starry night similar to this one:



Some of the code blocks you will need to use:



Purple Shell Challenge Cards

3

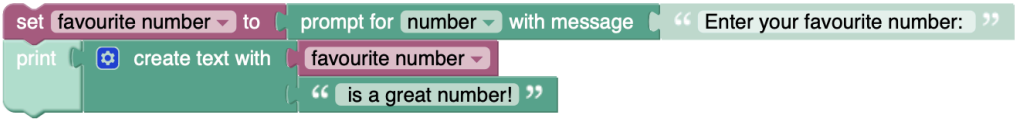
Number Input

Challenge:

Write a program that:

1. asks the user what their favourite number is.
2. stores the number input in a variable called “favourite number”
3. prints a message that says that their number is a great number.

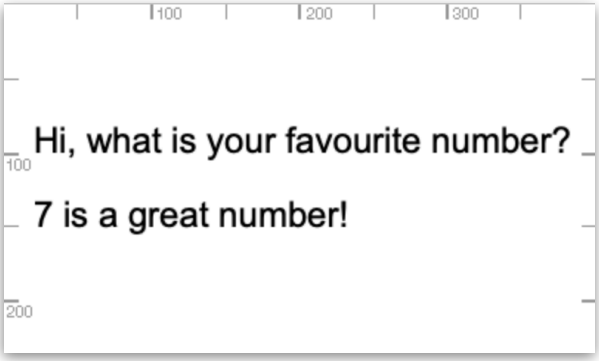
Your program should look something like this:



(The *prompt for number with message* block is in the Text folder.)

Extra:

Add more blocks so that the conversation appears in the drawing area:

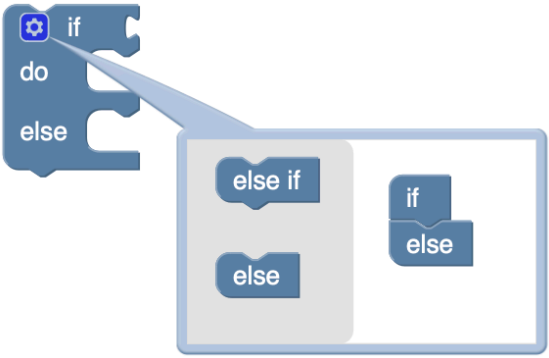


Favourite colour

Challenge:

Write a program that asks the user what their favourite colour is and then:
If they enter “yellow” prints: “Great yellow is my favourite too.”
If they enter any other colour prints: “Nice, My favourite is yellow.”

You will need to use the *if* code block from the Logic menu. To make it an *if … else* block, click on the **cog** ( ) and drag in an *else*. Click on the cog again to close this menu when you are done:



Extra:

Use the *display text* block so that the conversation takes place in the drawing area.

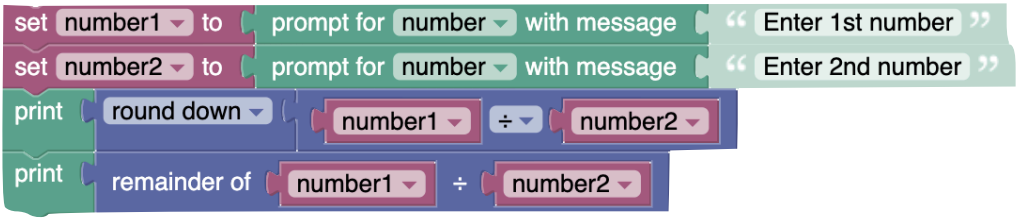
Purple Shell Challenge Cards

5

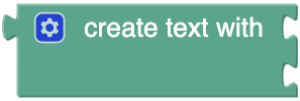
Divide two numbers

Challenge:

1. Write this program:



2. Now use the *create text with* block to put the numbers into one line of text. Example output: “3 remainder 2”



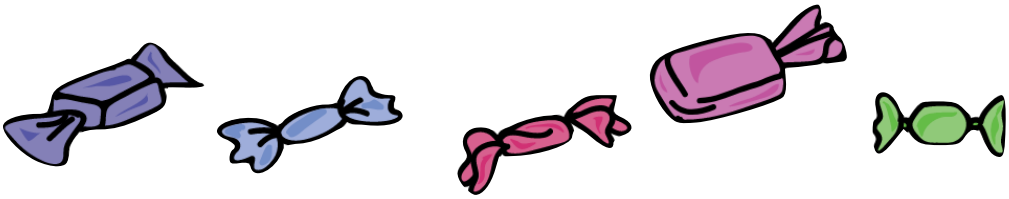
Extra:

Use the *display text* block so that the conversation takes place in the drawing area.

Purple Shell Challenge Cards

6

Sharing sweets



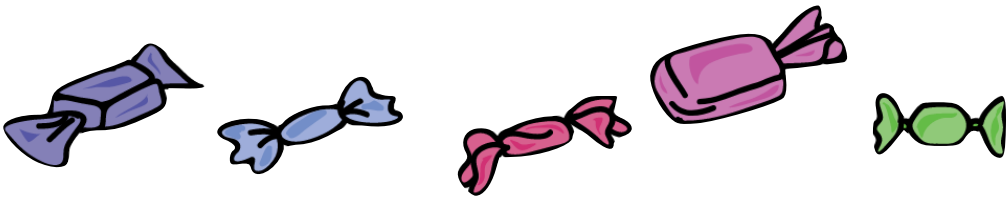
Challenge:

Write a program that

1. asks "How many sweets?" and stores the answer in a variable,
2. asks "How many people?" and stores the answer in a variable,
3. prints out how many sweets each person gets,
4. and prints out how many sweets are left over.

Extra:

Combine the text from 3 and 4 above into one text output.



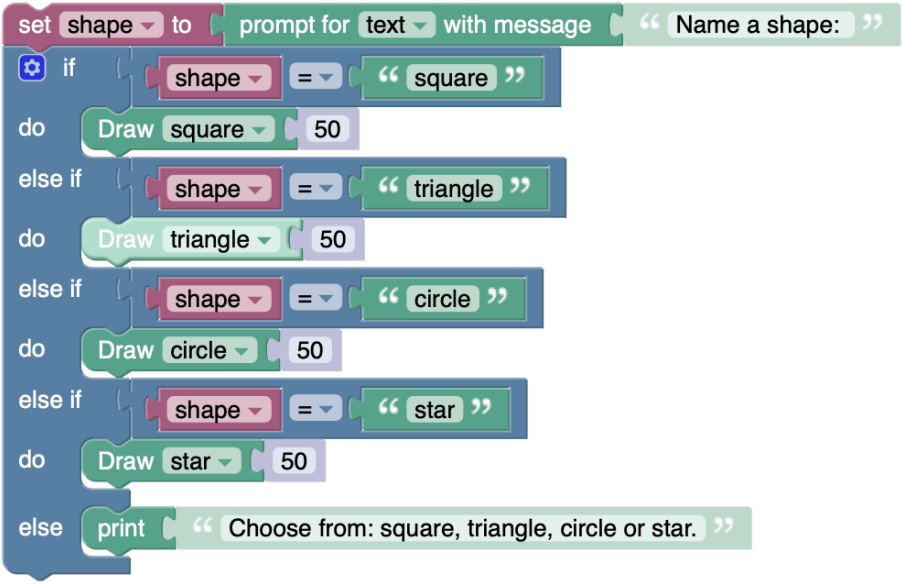
Purple Shell Challenge Cards

7

If, else if, and else

Challenge:

Make and test this program:



Hint:

To build the *if … else if … else if … else if … else* block, grab an *if … do* block from the Logic folder and then click on the blue **cog**. You can then drag what you need to the right. Click on the cog when finished.

Extra:

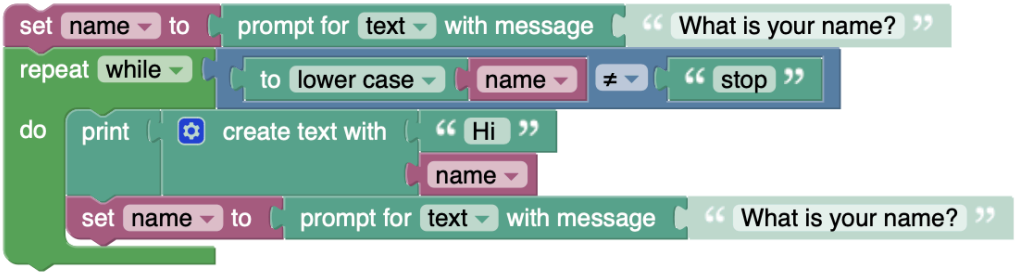
Add another possible choice: “turtle”. Your program then needs to draw a turtle if this shape is chosen.

Purple Shell Challenge Cards

8

While loops

A “while loop” keeps looping while a test is true. The program below keeps asking for a name and then saying hi.



Challenge:

1. Write the program shown above. Run it and enter your name.
2. Find out what you can type to stop the program running.

Somethings to think about:

1. What does the ≠ symbol mean?
2. The while loop continues if  is True.

   a. Is  True, if name is “Jane”?

   b. Is  True if name is “STOP”?

   c. Is  True if name is “Stop”?

Purple Shell Challenge Cards

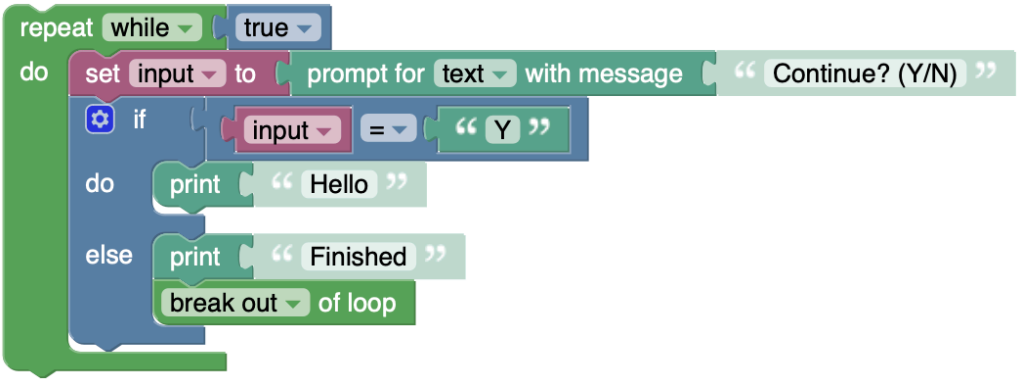
9

An infinite loop

Infinite loops never stop. They are easy to make with a *repeat while* block by adding a *true* block - Remember while loops keep looping while their test equals True.

Challenge:

1. Write the program shown below. Run it and enter Y.



2. Run the program again and enter anything except Y (e.g. N).

Something to think about:

a. How does the *break out of loop* block work with the *if … else* block, in the infinite loop?

Extra:

Improve the program so that the user can enter either “Y” or “y” to continue.

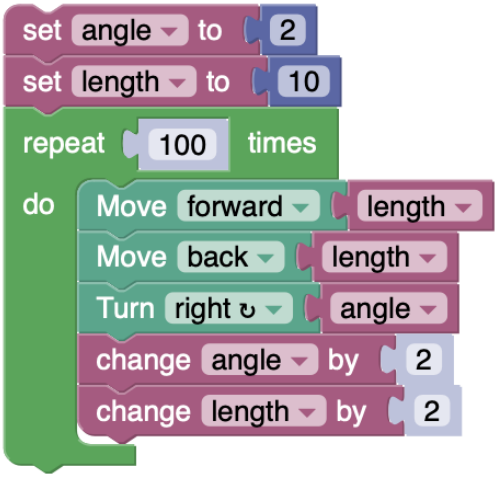
Purple Shell Challenge Cards

10

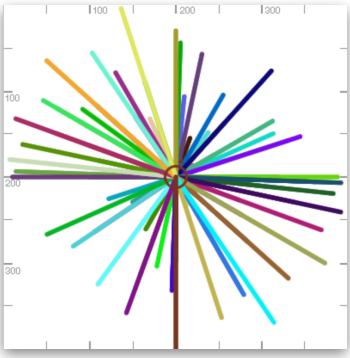
Stick animation

Challenge:

1. Make this program:



2. Run it at different speeds to see what is happening.
3. Make it colourful with the *random colour* block.



Purple Shell Challenge Cards

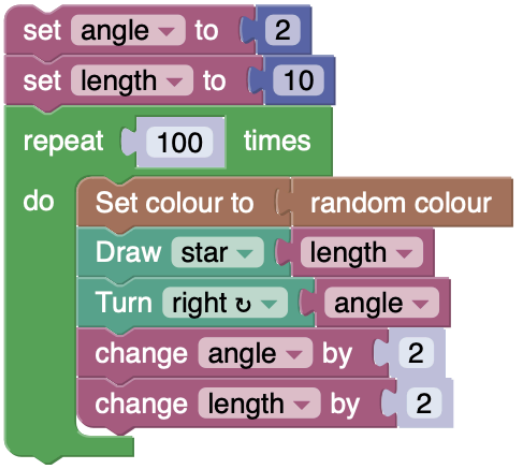
11

Spinning Shapes

Do not do this card if you have ever had a fit or seizure.

Challenge:

1. Make this program:



2. Run it at different speeds.
3. Try running it with different shapes.

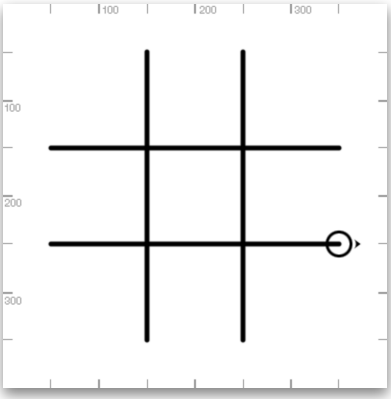
Purple Shell Challenge Cards

12

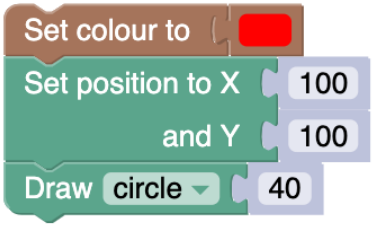
Noughts and Crosses

Challenge:

1. Write a program to draw this grid:

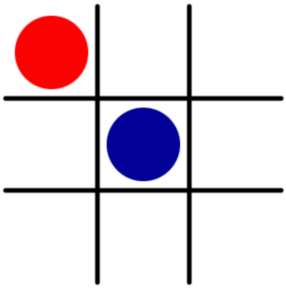


2. Add a *hide turtle* block.
3. Add a red circle like this:



4. Add a blue circle at another position.

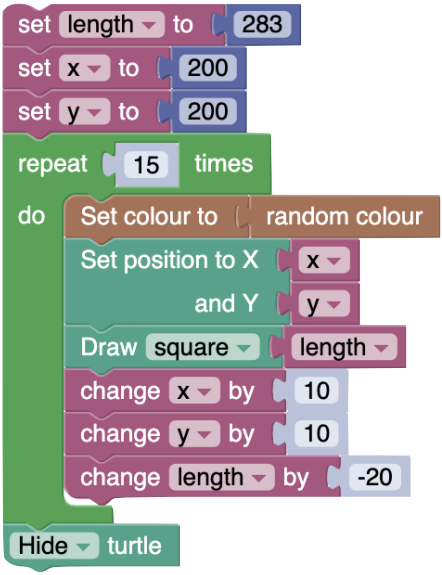
5. Delete the code that draws the circles.
6. Find a friend to play with and take turts to program your circles. (It is best to go first so your friend can see how to add code blocks to your program to draw their circles.)



Colourful wallpaper

Challenge:

1. Write this program:



2. Can you make any other patterns?

Extra:

Why not sign your best pattern using the *Display text* code block and print it out.

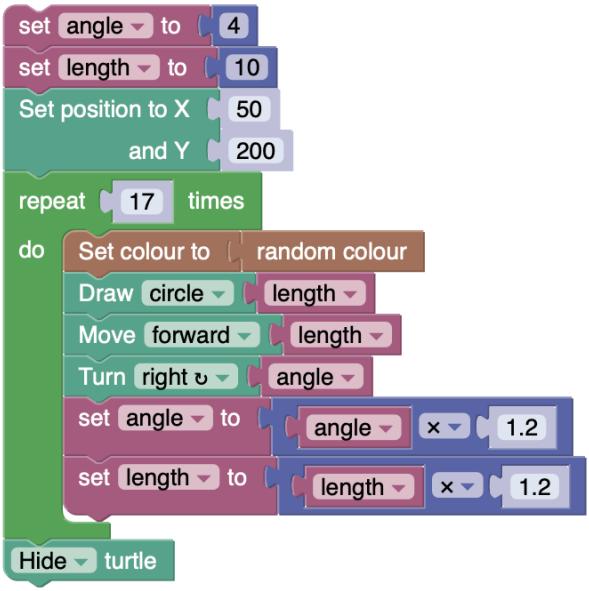
Purple Shell Challenge Cards

14

Painting with circles

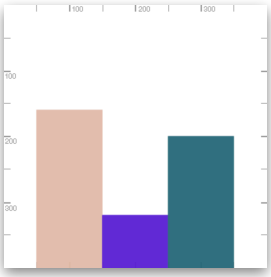
Challenge:

1. Write this program:



2. Choose a speed to run it at that makes a pleasant animation.
3. See what else you can make by changing the values of the variables.
4. Sign the best one using the *Display text* code block and print out the final image.

Bar Charts



Challenge:

1. Start a new program with this code:

```
set x-coord to 50
set y-coord to 400
set value1 to random integer from 1 to 9
set value2 to random integer from 1 to 9
set value3 to random integer from 1 to 9
Set width to 1
Hide turtle
```

2. Add this code, to your program, to draw a bar.

```
repeat 100 times
do
    Set position to X x-coord
                and Y y-coord
    Move forward value1 × 40
    Move back value1 × 40
    change x-coord by 1
```

3. Edit your program so it draws three bars, next to each other, with heights: value1, value2, value3, and random colours.
4. Save your program, if you haven't already done so.

Extra:

Edit your program so that a user can provide the values 1, 2 and 3.

Purple Shell Challenge Cards

16

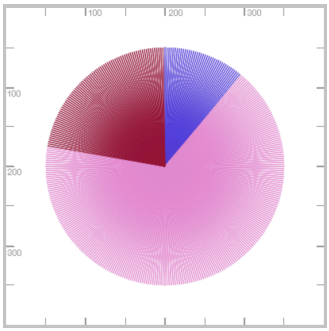
A Pie Chart

Challenge:

1. Start a new program with this code:

2. Make a **total** variable to store *value1* + *value2* + *value3*.
3. Make an **angle** variable to store how many degrees to turn for the first slice.
4. Write some code that calculates the angle using this maths formula:

   angle = round((value1 ÷ total) x 360)
5. Write code to draw the first slice of your pie chart.
6. Write code to calculate and draw the next two slices.
7. Save your program, if you have not already done so.
8. Run your program a few times and fix any bugs you find.



Hints:

- The angle calculated should be used for the number of times to loop in a slice
- In each loop the turtle should move forward and back, and then turn 1 degree.