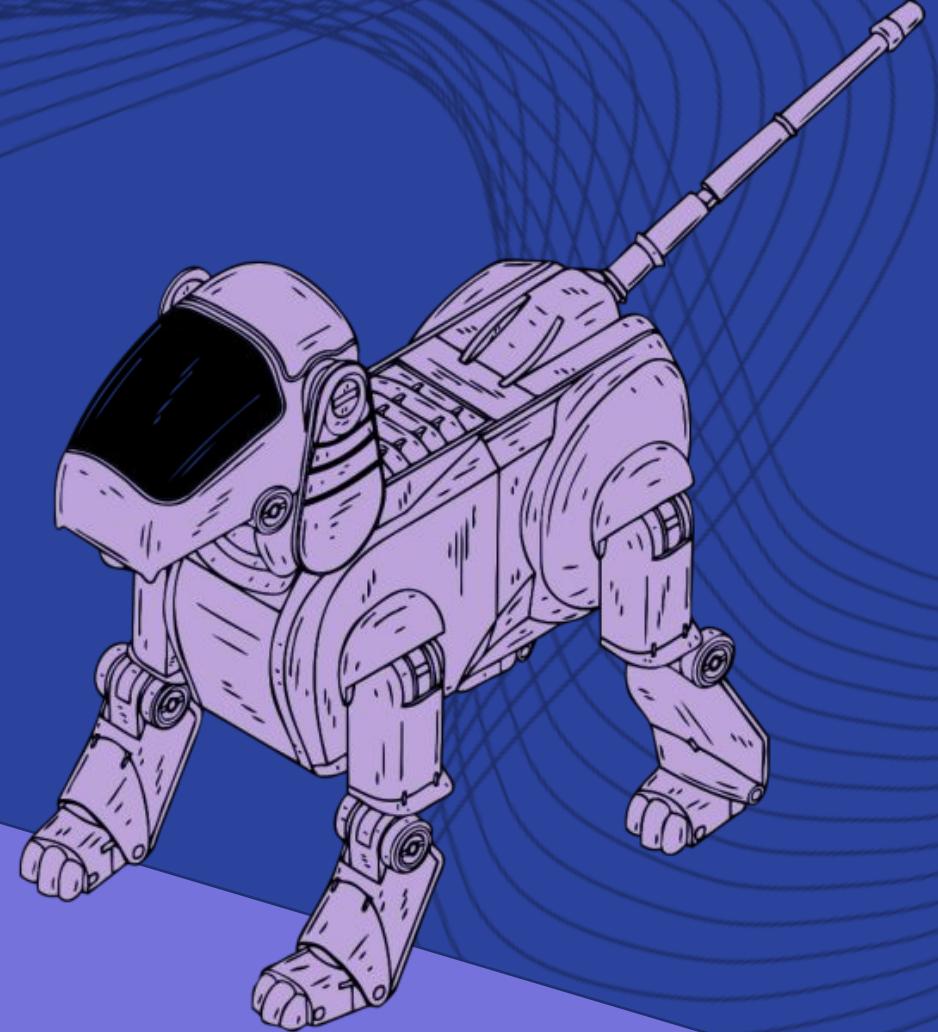


Homework Helper

Level 2 – Scratch

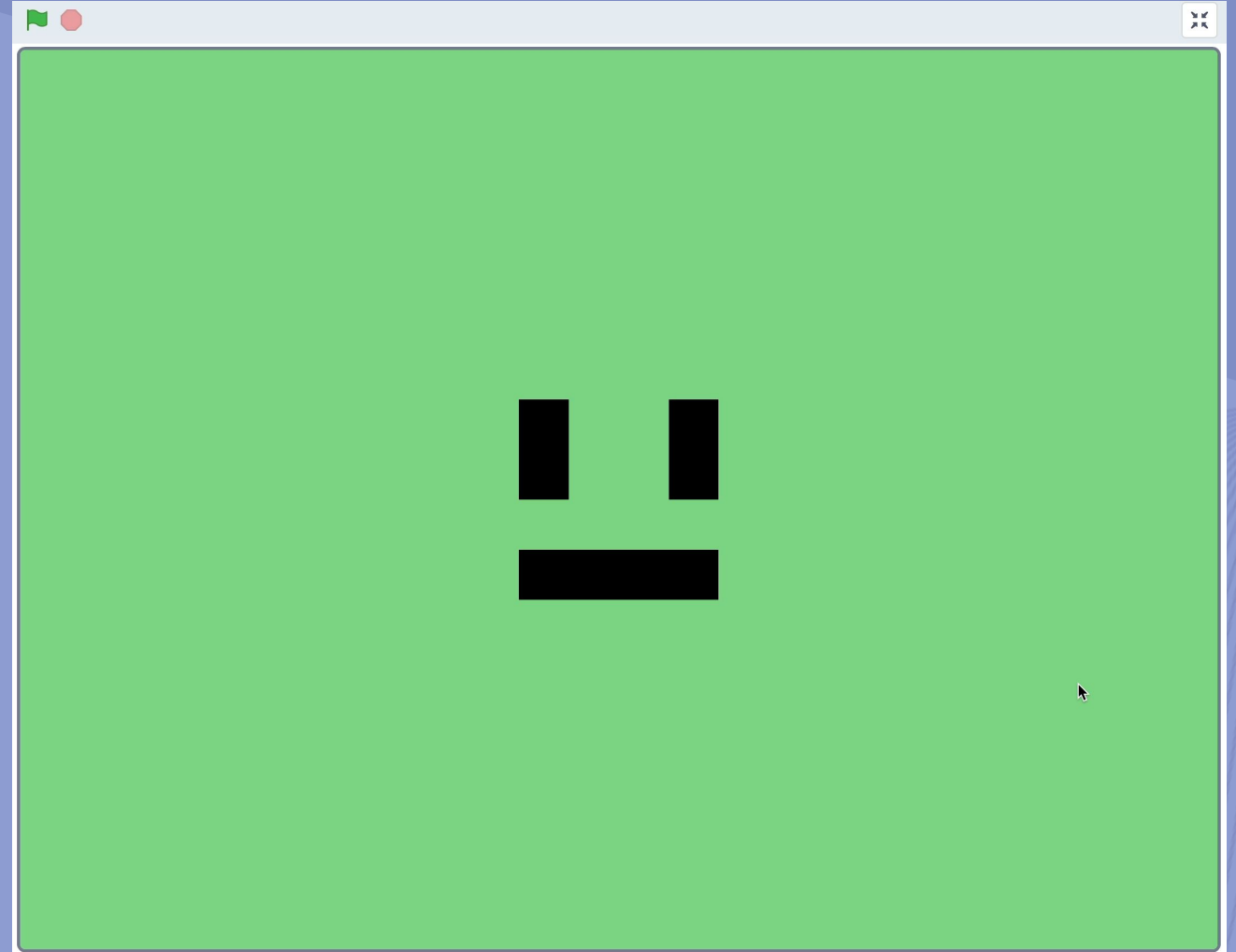
Helping Others



Process

Your code should...

- Ask the user to choose whether they want to add two numbers, multiply them, divide them or subtract them.
- The code should then calculate the result of these basic calculations.
- The result should be outputted to the user, and they should be able to hit the space bar to enter more calculations.



Designing a background in Scratch

The screenshot shows the Scratch background editor interface. At the top, there are options for 'Costume' (set to 'backdrop1'), 'Fill' (purple), 'Outline' (black), and a size of '4'. Below these are various tool icons: a selection tool (arrow), a fill tool (brush), a shape tool (square and circle), a text tool (T), and an eraser tool. A large central area is labeled 'This is the area where the design can be edited'. At the bottom, there is a 'Convert to Bitmap' button and zoom controls.

To select objects to drag and drop

To paint and fill with fill colour

To insert shapes

To insert text

To erase

This is the area where the design can be edited

Convert to Bitmap

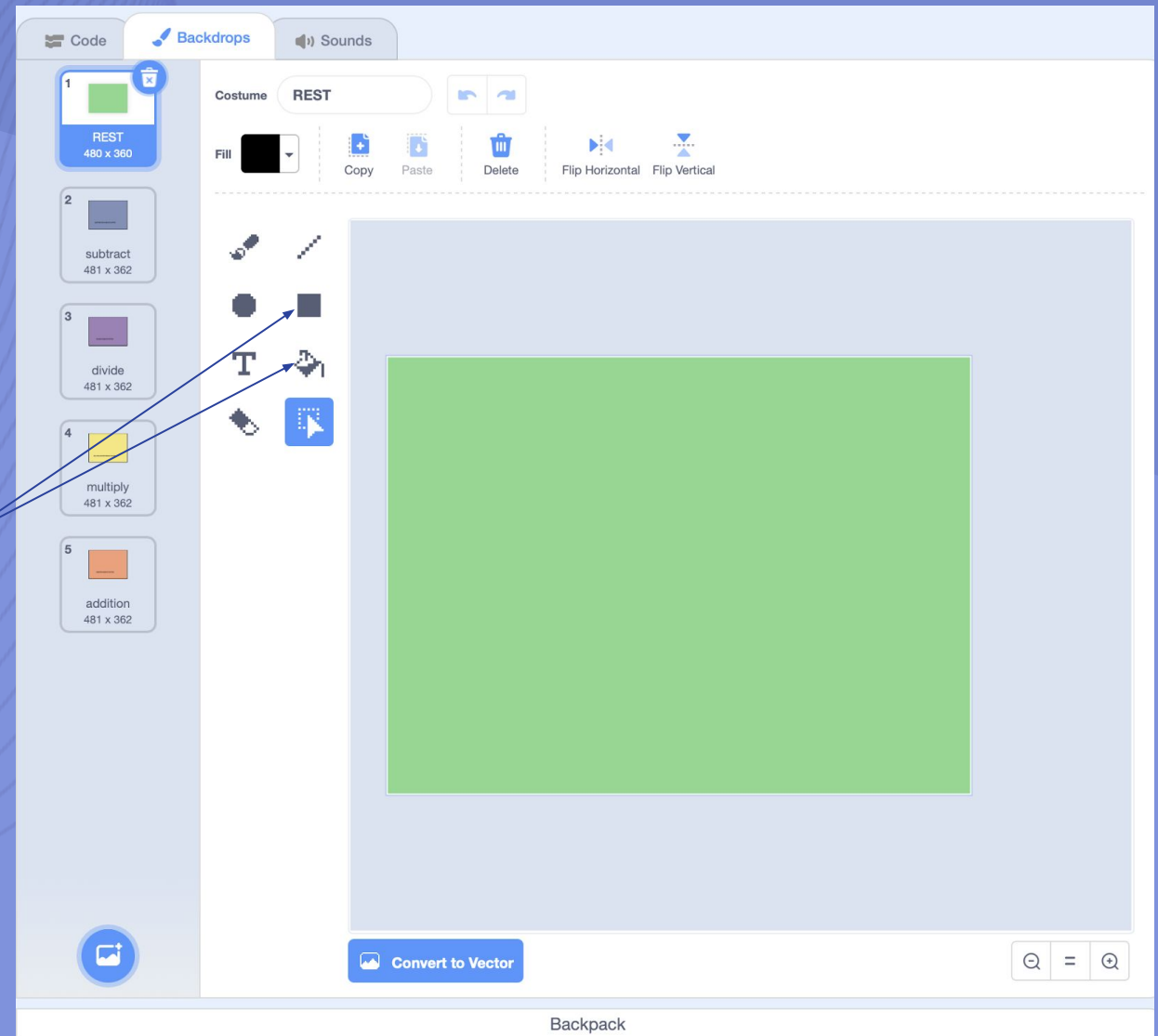
This icon allows you to import your own background or pictures that you want to use on your background, after saving them to your computer



Step 1

Design the resting background

To do this you should create a rectangle shape and fill it in the colour of your choice- this will be shown at the beginning and the end of your programme.



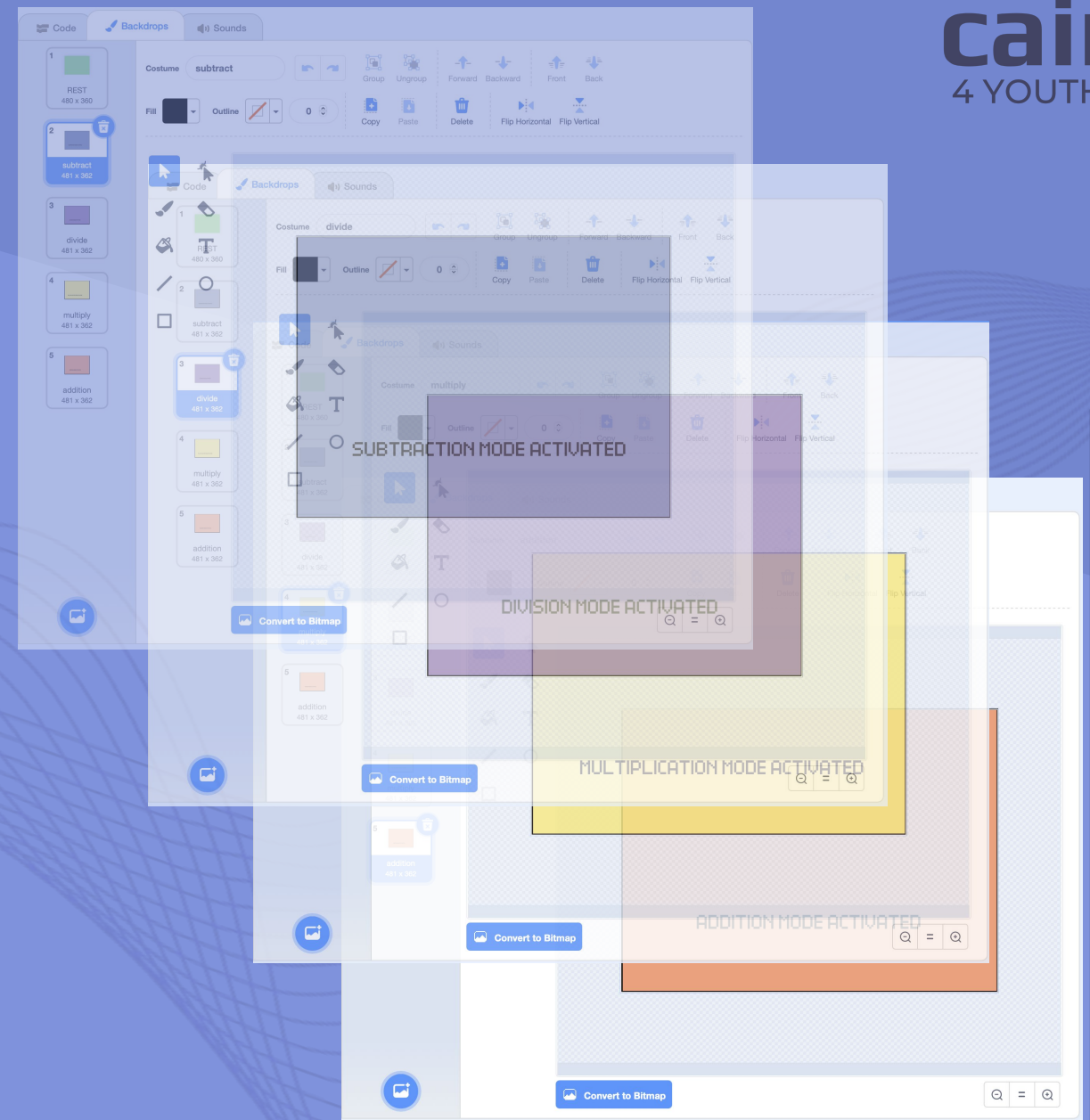
Step 2

Designing backgrounds for each function

As stated previously, there will be a different background for each of the 4 options that we will programme later.

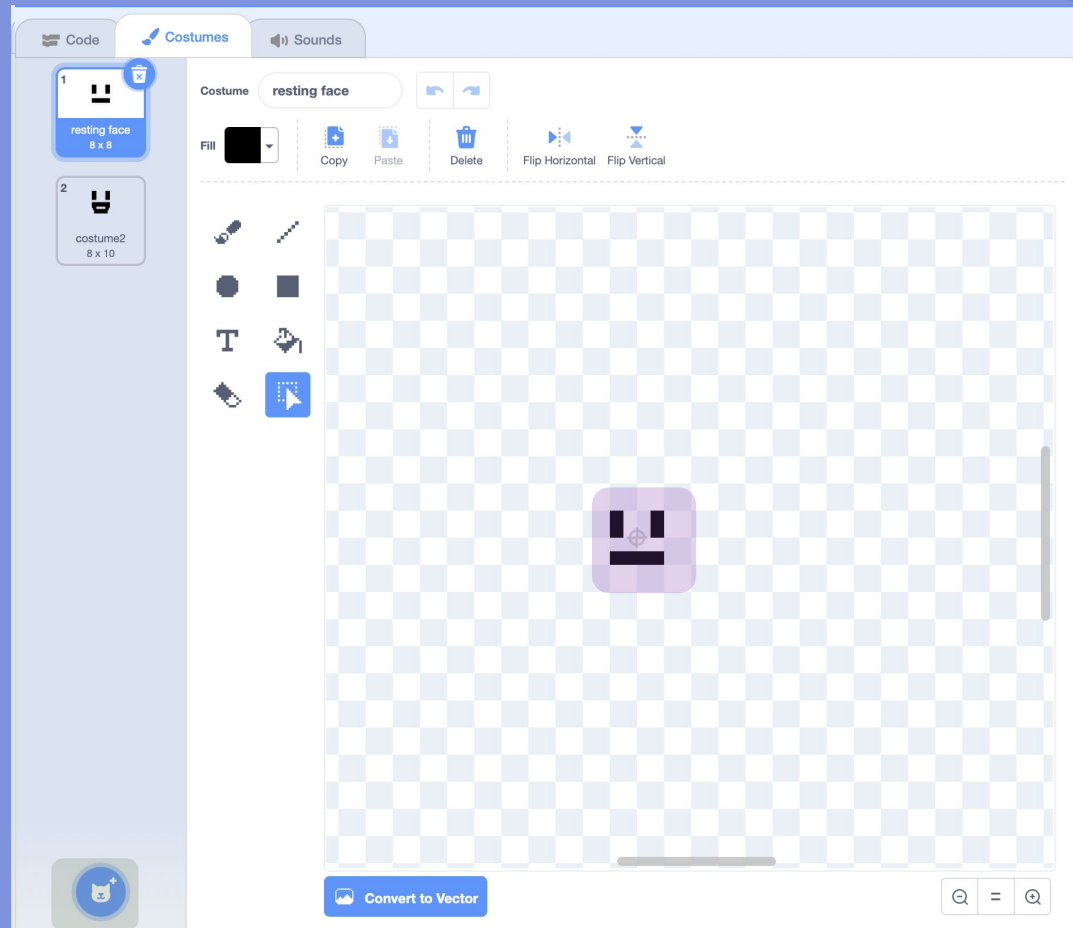
You can change the colour and even come up with a design for each of these—spend the next 10 minutes creating your own backgrounds for :

- Addition mode
- Subtraction mode
- Division mode
- Multiplication mode



Step 3

Sprites



In scratch, your **sprites** are the things that you programme, and all your code will be found when you click on the sprite you are coding for. To make your first sprite, click on the “new sprite” icon. This can be edited much like the background you have just created.

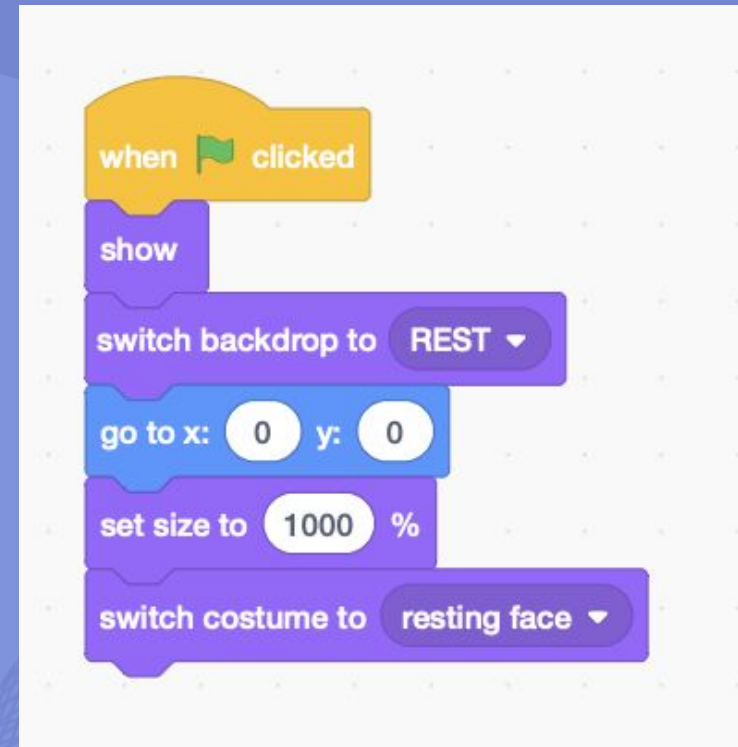
You should create two different costumes for your face sprite, which will be changed later. Make sure that you draw the face in the middle of the screen in whichever way you prefer.

Step 4

Resetting when the green flag is clicked

The sprite will be shown and the background will be set to the rest colour that was set initially, and the sprite will be moved to the middle of the screen (at position (0,0))

The size will be set to 1000%, due to the small size of the sprite when we designed it, if it is too big, just change the size to be lower.



Step 5

Answer variable

You should create a variable called “answer”, in the variable section of the code. This variable will store the result of any calculations.

The variable should be set to “not yet calculated”, and the variable should be hidden from the user for now.

```
when clicked clicked
show
switch backdrop to REST
go to x: 0 y: 0
set size to 1000 %
switch costume to resting face
set answer to not yet calculated
hide variable answer
```

The image shows a sequence of Scratch code blocks on a white grid background. The blocks are: a yellow 'when clicked' block, a purple 'show' block, a purple 'switch backdrop to REST' block, a blue 'go to x: 0 y: 0' block, a purple 'set size to 1000 %' block, a purple 'switch costume to resting face' block, an orange 'set answer to not yet calculated' block, and an orange 'hide variable answer' block.

Step 6

Changing the face

To get the effect that the homework helper is talking, we will use this repeat loop to change the costume of the face to the alternate version.

This code is all located in a forever loop, along with the 4 options to what the user can do asked in a question, this means that the code will repeat continuously until the stop button is pressed.

```

when clicked
  show
  switch backdrop to REST
  go to x: 0 y: 0
  set size to 1000 %
  switch costume to resting face
  set answer to not yet calculated
  hide variable answer
  forever
    repeat 50
      say What would you like me to solve?
      start sound talk
      if costume number = 1 then
        next costume
      else
        switch costume to resting face
    wait 1 seconds
    ask (a=add) (s=subtract) (m=multiply) (d=divide) and wait
  
```

Step 7

Addition option

If the user enters an “a”, then the backdrop will be switched to the addition backdrop. They will then be asked to enter the first number, which is stored in a variable called x and a second number which will be stored in y.

The answer will be calculated using the appropriate operator.

```

when clicked
  show
  switch backdrop to REST
  go to x: 0 y: 0
  set size to 1000 %
  switch costume to resting face
  set answer to not yet calculated
  hide variable answer
  forever
  repeat 50
  say What would you like me to solve?
  start sound talk
  if costume number = 1 then
  next costume
  else
  switch costume to resting face
  wait 1 seconds
  ask (a=add) (s=subtract) (m=multiply) (d=divide) and wait
  if answer = a then
  switch backdrop to addition
  ask What is the first number? and wait
  set x to answer
  ask What is the second number? and wait
  set y to answer
  set answer to x + y
  
```

See if you can work out the next lot of code....

Using the addition code, do the same for subtraction, division and multiplication

```

if answer = s then
  switch backdrop to subtract
  ask What is the first number? and wait
  set x to answer
  ask What is the second number? and wait
  set y to answer
  set answer to x - y
  
```

Subtraction

```

if answer = m then
  switch backdrop to multiply
  ask What is the first number? and wait
  set x to answer
  ask What is the second number? and wait
  set y to answer
  set answer to x * y
  
```

Multiplication

```

if answer = d then
  switch backdrop to divide
  ask What is the first number? and wait
  set x to answer
  ask What is the second number? and wait
  set y to answer
  set answer to x / y
  
```

Division

Step 8

Showing the answer

After compiling all the code, the next thing to do is display the final answer to the user: the background should be changed to the resting face and the variable containing the answer should be shown.

The same code from the beginning to change the facial expression will run, and then the user will have to press the space key for all of the code to run again and another calculation to be performed.

```

set answer to x / y
switch backdrop to REST
show variable answer
repeat 10
  if costume number = 1 then
    next costume
    start sound talk
  else
    switch costume to resting face
wait until key space pressed?
hide variable answer
  
```


What the final code should look like...

As you can see, your final code will be very long. See if you can add a few more options for either mathematical operations (such as seeing which number is greater than another, or finding a number as an exponent of another e.c.t) or even scientific equations (such as working out the magnification of a microscope, or percentage increase in mass)

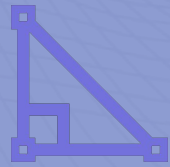
```

when clicked
  show
  switch backdrop to REST
  go to x: 0 y: 0
  set size to 1000 %
  switch costume to resting face
  set answer to not yet calculated
  hide variable answer
  forever
    repeat 50
      say What would you like me to solve?
      start sound talk
      if costume number = 1 then
        next costume
      else
        switch costume to resting face
    repeat 10
      ask ((a=add)(s=subtract)(m=multiply)(d=divide) and wait
      if answer = a then
        switch backdrop to addition
        ask What is the first number? and wait
        set x to answer
        ask What is the second number? and wait
        set y to answer
        set answer to x + y
  
```

```

if answer = s then
  switch backdrop to subtract
  ask What is the first number? and wait
  set x to answer
  ask What is the second number? and wait
  set y to answer
  set answer to x - y
if answer = m then
  switch backdrop to multiply
  ask What is the first number? and wait
  set x to answer
  ask What is the second number? and wait
  set y to answer
  set answer to x * y
if answer = d then
  switch backdrop to divide
  ask What is the first number? and wait
  set x to answer
  ask What is the second number? and wait
  set y to answer
  set answer to x / y
switch backdrop to REST
show variable answer
repeat 10
  if costume number = 1 then
    next costume
    start sound talk
  else
    switch costume to resting face
wait until key space pressed?
hide variable answer
  
```


Links to everyday life



Mathematics

Basic maths skills are integral for all walks of life and so this code can encourage the links that can be formed between programming and basic arithmetic.



Design

Designing the different backgrounds can develop scratchers design skills and encourage creativity in the interface of the programme.

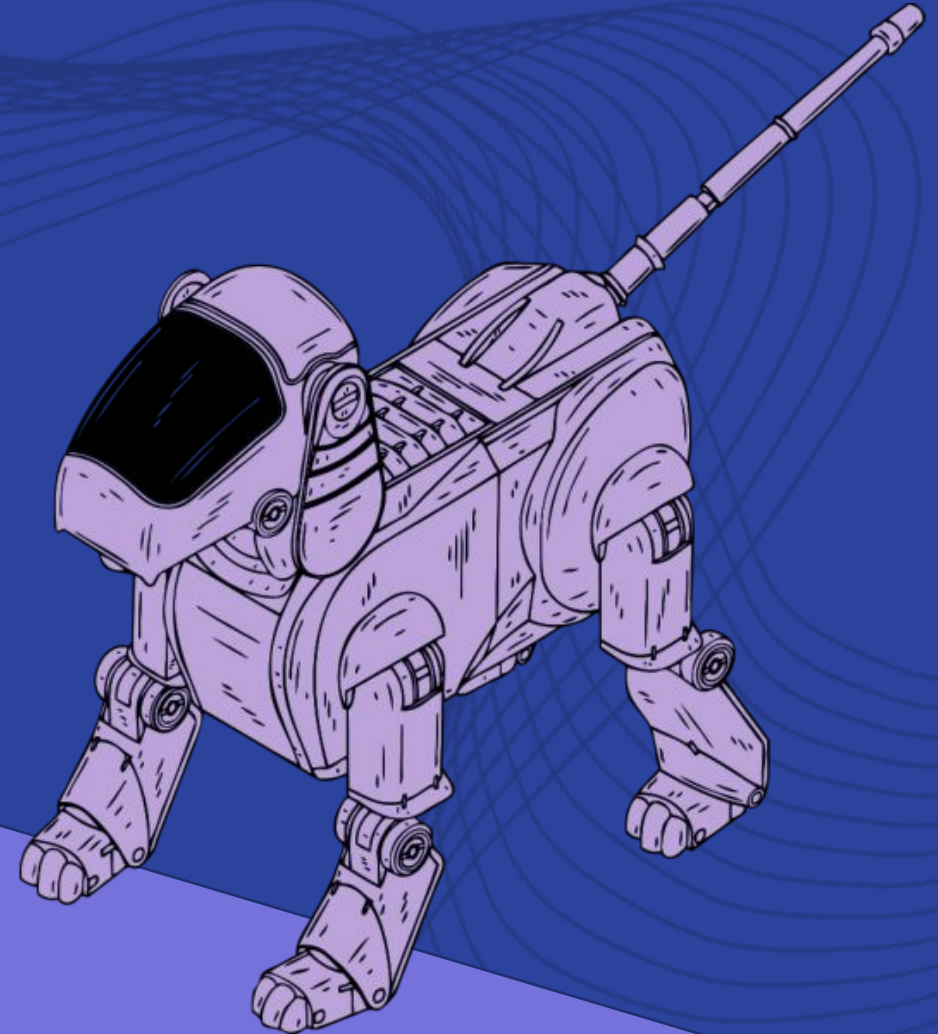


Problem solving

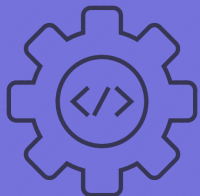
Programming software to solve a program for others requires a great understanding of how to solve a problem yourself, making this code a great jumping-off point for further projects.

Congratulations!

You have completed the
homework helper



cair
4 YOUTH



link to example code-
<https://scratch.mit.edu/projects/669903538>