



uCode

BLOCK GUIDE

UBTECH
EDUCATION

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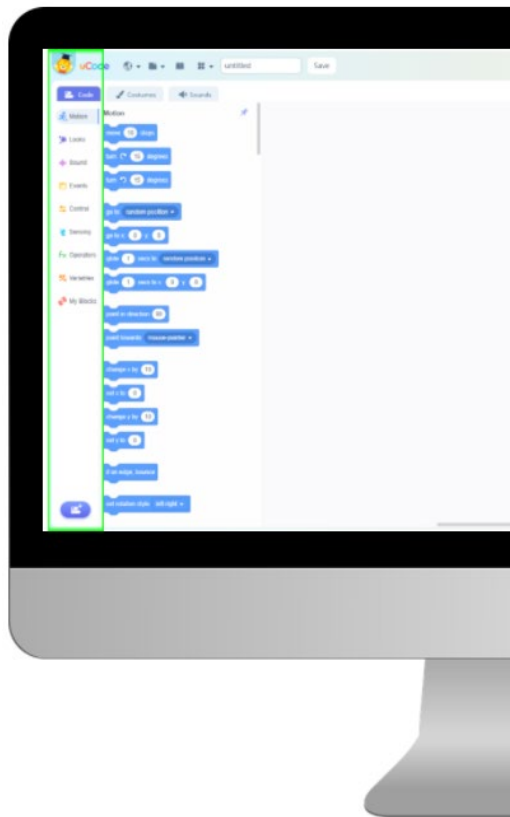
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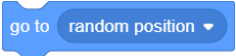


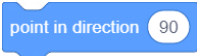

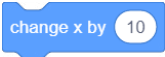




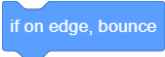
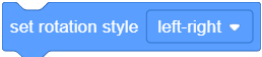
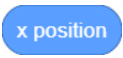
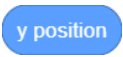
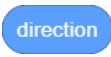
WELCOME!

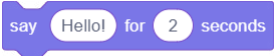
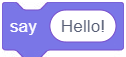
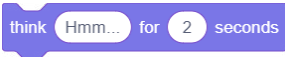

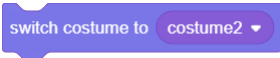
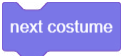
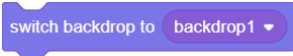
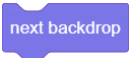
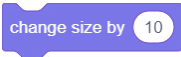
This interactive guide will introduce you to the blocks used in **Stage Mode** of [uCode](#). Each block resides in a color-coded drawer that can be found on the left side of the screen. At the bottom-left corner of the screen is the **Add Extension** button. The extensions found here can be enabled and disabled as needed. When enabled, they will appear below the **My Blocks** drawer.

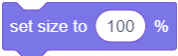
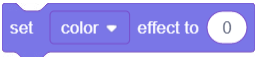
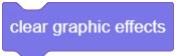


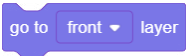
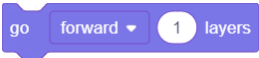



DRAWER NAME	DRAWER IMAGE	BLOCKS IN THIS DRAWER ARE USED TO...
Motion	 Motion	control the movement of the sprite(s)
Looks	 Looks	change the sprite's overall appearance or make it say or think something
Sound	 Sound	add sounds and sound effects, adjust volume, and edit pitch
Events	 Events	control events and start programs
Control	 Control	control programs
Sensing	 Sensing	detect things
Operators	 Operators	perform math functions
Variables	 Variables	represent data
My Blocks	 My Blocks	create custom blocks
Add Extension		extend programming capabilities

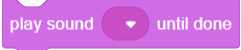
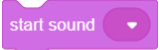
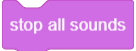
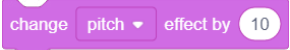
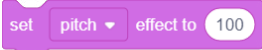
MOTION BLOCK IMAGE	THIS BLOCK...
	<p>moves the sprite forward (in the direction it is facing) the number of steps shown</p>
	<p>turns the sprite to the right (clockwise) the specified number of degrees</p>
	<p>turns the sprite to the left (counter-clockwise) the specified number of degrees</p>
	<p>moves the sprite to a random position or to the mouse pointer (cursor)</p>
	<p>moves the sprite to the specified x and y position</p>
	<p>glides the sprite in the specified amount of time to a random position or to the mouse pointer (cursor)</p>
	<p>points the sprite in the direction</p>
	<p>points the sprite towards the mouse pointer (cursor)</p>
	<p>changes the sprite's x position by the specified number</p>

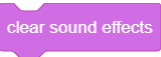
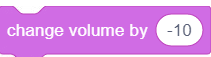
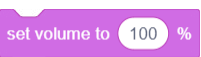

MOTION BLOCK IMAGE	THIS BLOCK...
	<p>changes the sprite's y position by the specified number</p>
	<p>sets the sprite's y position to the specified location along the y-axis</p>
	<p>flips the sprite over and sends it to the other side of the screen</p>
	<p>sets the rotation style of the sprite</p>
	<p>displays the value of the x coordinate of the sprite</p>
	<p>displays the value of the y coordinate of the sprite</p>
	<p>displays the direction of the current sprite</p>




LOOKS BLOCK IMAGE	THIS BLOCK...
	displays a speech bubble over the sprite for the specified amount of time
	displays a speech bubble over the sprite
	displays a thought bubble over the sprite for the specified amount of time
	displays a thought bubble over the sprite
	changes the sprite's costume to the one specified
	changes the sprite's costume to the next one on the costume list
	changes the stage's backdrop to the one specified
	changes the stage's backdrop to the next one on the backdrop list
	increases the sprite's size by the specified number

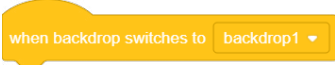




LOOKS BLOCK IMAGE	THIS BLOCK...
	sets the sprite's size to the specified percentage
	changes the specified effect by the specified number
	sets the specified effect to the specified number
	clears all graphic effects on the sprite
	shows the sprite
	hides the sprite
	places the sprite in the specified layer
	moves the sprite according to the specified layer number
	displays the sprite's costume being used



LOOKS BLOCK IMAGE	THIS BLOCK...
	displays the backdrop being used
	displays the sprite's size




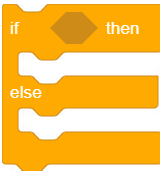

SOUND BLOCK IMAGE	THIS BLOCK...
	plays the specified sound until done
	starts the specified sound
	stops all sounds
	changes the effect by the number specified
	sets the effect by the number specified






SOUND BLOCK IMAGE	THIS BLOCK...
	clears all sound effects
	changes the volume by the number specified
	sets the volume by the percentage specified
	displays the value of the current volume


EVENTS BLOCK IMAGE	THIS BLOCK...
	activates the program when the green flag button is clicked
	activates the program when the specified key is pressed
	activates the program when the sprite is clicked




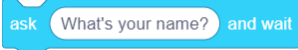





EVENTS BLOCK IMAGE	THIS BLOCK...
	<p>activates the program when the backdrop switches to the one specified</p>
	<p>activates the program when the first value is greater than the second</p>
	<p>activates the program when the broadcast is received</p>
	<p>sends a broadcast; activates the when I receive block</p>
	<p>sends a broadcast and pauses until all programs activated by the broadcast are completed; activates the when I receive block</p>


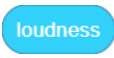


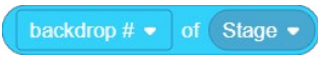



CONTROL BLOCK IMAGE	THIS BLOCK...
	<p>pauses the program for the specified amount of time</p>
	<p>runs the contained blocks for the specified number of times</p>










CONTROL BLOCK IMAGE	THIS BLOCK...
	<p>runs the contained blocks forever or until the stop sign button is clicked</p>
	<p>runs the contained blocks when the variable (i) is less than the end value (j); each time i increases by n ($i = i + n$)</p>
	<p>runs the contained blocks if the condition is true</p>
	<p>runs the first set of contained blocks if the condition is true and activates the second set of contained blocks if the condition is false</p>
	<p>pauses the program until the condition is met</p>

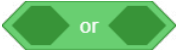


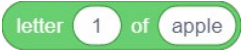





CONTROL BLOCK IMAGE	THIS BLOCK...
	runs the contained blocks until the condition is met
	stops the specified program(s)
	executes the program below it when a clone is generated
	creates the specified clone
	deletes the clone








SENSING BLOCK IMAGE	THIS BLOCK...
	tests if the sprite is touching the mouse pointer (cursor) or the edge of the stage screen


SENSING BLOCK IMAGE	THIS BLOCK...
 <p>The block is a blue arrow pointing right. It contains the text "touching color" followed by a yellow circle and a question mark.</p>	<p>tests if the sprite is touching a specific color</p>
 <p>The block is a blue arrow pointing right. It contains the text "color" followed by a dark blue circle, "is touching" followed by a light green circle, and a question mark.</p>	<p>tests if a color on the sprite is touching the specified color</p>
 <p>The block is a blue rounded rectangle. It contains the text "distance to" followed by a dropdown menu showing "mouse-pointer" with a downward arrow.</p>	<p>tests the distance of the sprite to the mouse pointer (cursor)</p>
 <p>The block is a blue arrow pointing right. It contains the text "ask" followed by a text input field with "What's your name?" and "and wait".</p>	<p>activates an input box for the user to type in</p>
 <p>The block is a blue rounded rectangle. It contains the text "answer".</p>	<p>stores the value typed in the input box created by the ask () and wait block</p>
 <p>The block is a blue arrow pointing right. It contains the text "key" followed by a dropdown menu showing "space" with a downward arrow, and "pressed?".</p>	<p>tests if the specified key is pressed</p>
 <p>The block is a blue arrow pointing right. It contains the text "mouse down?".</p>	<p>tests if the mouse mouse button is clicked</p>
 <p>The block is a blue rounded rectangle. It contains the text "mouse x".</p>	<p>displays the position of the mouse pointer (cursor) on the x-axis</p>
 <p>The block is a blue rounded rectangle. It contains the text "mouse y".</p>	<p>displays the position of the mouse pointer (cursor) on the y-axis</p>












SENSING BLOCK IMAGE	THIS BLOCK...
	sets the drag mode of the sprite
	displays the volume of noise through the microphone
	displays how much time has passed since the program has started
	resets the timer
	displays the backdrop number/name, volume, or custom variable of the stage
	displays the current year, month, date, day of the week, hour, minute, or second
	displays the number of days since 2000
	displays the username of the user

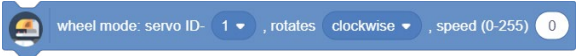


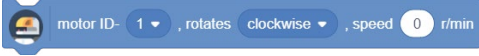
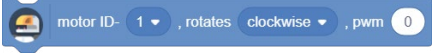
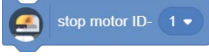
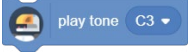

OPERATOR BLOCK IMAGE	THIS BLOCK...
	adds two values
	subtracts the second value from the first
	multiplies two values
	divides the first value by the second
	picks a random number between the two specified
	tests if the first value is greater than the second
	tests if the first value is less than the second
	tests if the two values are equal
	tests if both conditions are true



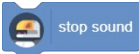
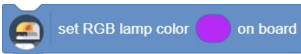


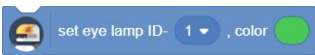
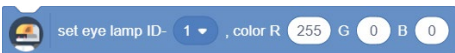
OPERATOR BLOCK IMAGE	THIS BLOCK...
	tests if either condition is true
	reverses the outcome of the condition: if the condition is met, this becomes false or true if the condition is not met
	combines two words together
	displays the specified letter of a specified word or sentence
	displays the number of letters (or numbers) in a specified word or sentence
	checks if the first parameter's text contains the second parameter's text
	gets the remainder of the first number when it's divided by the second one
	gets the rounding decimal number to the nearest whole number
	provides a whole collection of math functions to be applied to the specified value


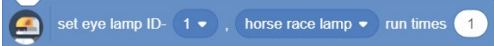
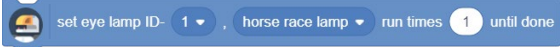


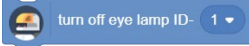

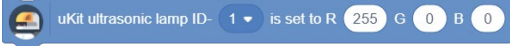
VARIABLE BLOCK IMAGE	THIS BLOCK...
	enables you to create your own variable
	contains the value of the variable you created
	sets the value of the specified variable
	changes the specified value by the specified number
	displays the variable in the stage monitor
	hides the variable in the stage monitor
	enables you to create a list



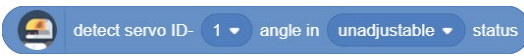
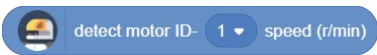


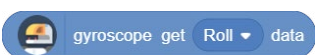
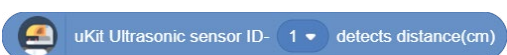
MY BLOCKS IMAGE	THIS BLOCK...
	enables you to create your own block









EXTENSION NAME	EXTENSION IMAGE	BLOCKS IN THIS EXTENSION ARE USED TO...
uKit Explore	 uKit Explore V1.0.0	connect to the UKIT Advanced main control board
uKit AI	 uKit AI V1.0.0	connect to UKIT AI <i>Note: These will not be covered in this guide.</i>
AlphaMini	 AlphaMini ro... V1.0.0	connect to AlphaMini <i>Note: These will not be covered in this guide.</i>
AI	 AI V1.0.0	create AI programs in real time
Internet	 Internet V1.0.0	connect projects to the Internet <i>Note: These will not be covered in this guide.</i>
micro:bit	 micro:bit V1.0.0	connect to micro:bit
Pen	 Pen V1.0.0	turn sprites into drawing tools
Video Sensing	 Video Sensing V1.0.0	access your computer's camera for real-time interaction
Music	 Music V1.0.0	compose songs
Text to Speech	 Text to Speech V1.0.0	turn text into speech
Translate	 Translate V1.0.0	translate text into different languages

UKIT EXPLORE BLOCK IMAGE	THIS BLOCK...
	<p>rotates the specified servo in the specified direction at the speed entered (0-255), in wheel mode</p>
	<p>rotates the specified servo to the designated degree/ angle (-118°-118°) for the specified time (100-5000 ms)</p>
	<p>stops the specified servo</p>
	<p>rotates the specified DC motor in the specified direction at the speed entered</p>
	<p>rotates the specified DC motor in the specified direction using PWM (pulse width modulation)</p>
	<p>stops the specified DC motor from running</p>
	<p>plays the selected note on the onboard speaker</p>
	<p>plays the selected note for a specified amount of time on the onboard speaker</p>

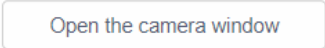
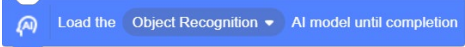
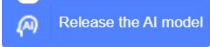
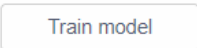
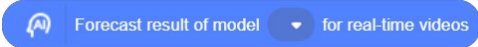
UKIT EXPLORE BLOCK IMAGE	THIS BLOCK...
	plays a sound at the specified frequency on the onboard speaker
	plays a sound at the specified frequency for a specified amount of time on the onboard speaker
	stops all sounds
	lights up the onboard RGB lights to the specified color
	lights up the onboard RGB lights with custom colors (0-255)
	turns off the RGB lamp on the board
	sets the color for the specified LED
	sets the custom color for the specified LED

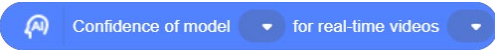

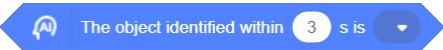
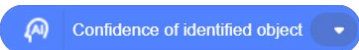
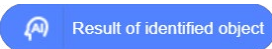

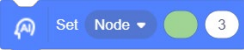
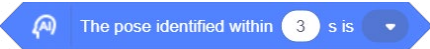
UKIT EXPLORE BLOCK IMAGE	THIS BLOCK...
	sets the color and expression (effect) for the specified LED that will run a set number of times
	sets the effect for the specified LED to run a set number of times while continuing the program
	sets the effect for the specified LED to run a set number of times until complete before continuing with the program
	allows for color customization of each LED for the specified amount of time while continuing the program
	allows for color customization of each LED for the specified amount of time before continuing with the program
	turns off the specified LED
	sets the specified ultrasonic light to a specific color
	sets the specified ultrasonic light to a custom color

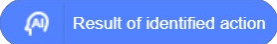
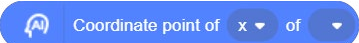
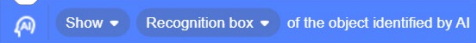

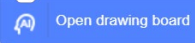
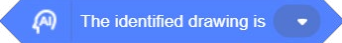


UKIT EXPLORE BLOCK IMAGE	THIS BLOCK...
	<p>turns off the ultrasonic light</p>
	<p>tests if the specified grayscale sensor is detecting dark or light colors</p>
	<p>displays the angle of the specified servo</p>
	<p>displays the speed of the specified motor</p>
	<p>displays the voltage of the battery connected to the board</p>
	<p>displays the acceleration or angular velocity of the gyroscope on the specified axis</p>
	<p>displays the roll or pitch data of the onboard gyroscope</p>
	<p>displays the distance detected by the specified ultrasonic sensor</p>

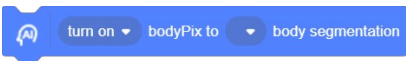
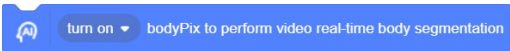
UKIT EXPLORE BLOCK IMAGE	THIS BLOCK...
	<p>displays the distance detected by the specified IR sensor</p>
	<p>sets the press status of the specified touch sensor</p>
	<p>sets the press status of the button on the board</p>
	<p>displays the brightness value detected by the light sensor</p>
	<p>displays the sound intensity value detected by the specified sound sensor</p>
	<p>displays the percentage of humidity detected by the temperature and humidity sensor</p>
	<p>displays the temperature (°F or °C) detected by the temperature and humidity sensor</p>
	<p>displays the color value (R, G, or B) detected by the color sensor</p>

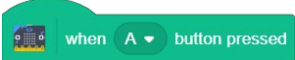
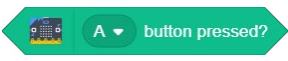

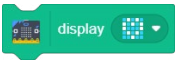
UKIT EXPLORE BLOCK IMAGE	THIS BLOCK...
	<p>detects the specified color using the specified color sensor</p>

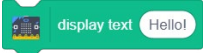
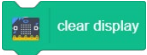
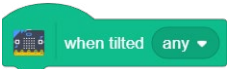

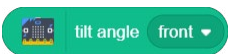
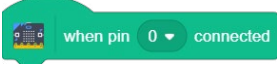
AI BLOCK IMAGE	THIS BLOCK...
	<p>opens your webcam in a pop-up window</p>
	<p>loads the selected AI model</p>
	<p>releases the AI model</p>
	<p>allows you to train a machine learning model</p>
	<p>displays the detection results of the currently selected AI model in real time</p>





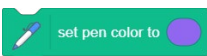
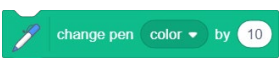
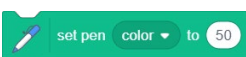
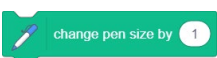
AI BLOCK IMAGE	THIS BLOCK...
	displays the confidence score of the current real-time video model
	detects whether the current real-time video detection result is the specified class
	compares the recognized object with the selected object within the time specified
	displays the confidence score of the identified object selected
	displays the results of the identified object
	displays the central coordinate point, on the x- or y-axis, of the identified object selected
	sets the size/thickness and color of the nodes or skeleton
	compares the recognized pose with the selected pose within the time specified

AI BLOCK IMAGE	THIS BLOCK...
	<p>displays the coordinate point of the action or node</p>
	<p>displays the coordinate point, on the x- or y-axis, of the selected body part</p>
	<p>shows/hides the selected information of the identified object</p>
	<p>shows/hides the line segment between the specified coordinate points</p>
	<p>opens the AI drawing board</p>
	<p>compares the drawing on the drawing board with the selected drawings</p>
	<p>displays the results of the identified drawing</p>
	<p>displays the confidence score of the identified drawing selected</p>

AI BLOCK IMAGE	THIS BLOCK...
	<p>recognizes a human silhouette in a portrait and removes the surrounding background</p>
	<p>recognizes a human silhouette in a real-time video and removes the surrounding background</p>


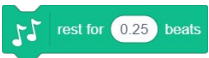
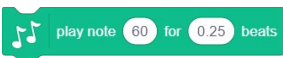
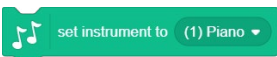
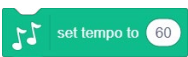
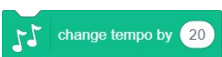
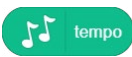
MICRO:BIT BLOCK IMAGE	THIS BLOCK...
	<p>activates the program when the specified button is pressed on the micro:bit</p>
	<p>detects if a specified button is pressed</p>
	<p>activates the program when the micro:bit is moved, shaken, or jumped</p>
	<p>displays a shape or design on the micro:bit's display</p>

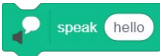
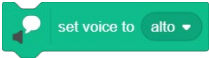
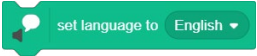
MICRO:BIT BLOCK IMAGE	THIS BLOCK...
	<p>displays the specified text on the micro:bit display</p>
	<p>clears the micro:bit display, turning off the LEDs</p>
	<p>activates the program when the micro:bit is tilted in the specified direction</p>
	<p>detects if the micro:bit is tilted</p>
	<p>displays the tilt angle of the micro:bit</p>
	<p>activates the program when a pin on the micro:bit is connected to a wire, crocodile clip, or other electronic conductor</p>

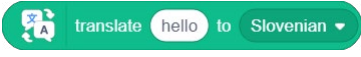

PEN BLOCK IMAGE	THIS BLOCK...
	removes all marks made by the pen
	causes the sprite to produce a bitmap image of itself, which is stamped onto the stage
	makes the sprite draw a trail wherever it moves
	makes the sprite stop drawing a trail
	sets the pen color to the one specified
	changes the specified color, saturation, brightness (shade), and transparency by the value specified
	sets the pen's color, saturation, brightness (shade), and transparency by the value specified
	changes the pen size by the specified number

PEN BLOCK IMAGE	THIS BLOCK...
<p>The image shows a green block with a pen icon on the left, the text 'set pen size to', and a white circle containing the number '1' on the right.</p>	<p>sets the pen size to the number specified</p>

VIDEO SENSING BLOCK IMAGE	THIS BLOCK...
<p>The image shows a green block with a video camera icon on the left, the text 'when video motion >', and a white circle containing the number '10' on the right.</p>	<p>activates the program when the current video motion on the stage is greater than the specified value</p>
<p>The image shows a green block with a video camera icon on the left, followed by the text 'video', a dropdown menu showing 'motion', the text 'on', and another dropdown menu showing 'sprite'.</p>	<p>provides the values of the video, either motion (on a scale of 1 to 100) or direction (which way the detected motion is going), on either the stage or the sprite</p>
<p>The image shows a green block with a video camera icon on the left, the text 'turn video', and a dropdown menu showing 'off'.</p>	<p>turns the webcam on or off</p>
<p>The image shows a green block with a video camera icon on the left, the text 'set video transparency to', and a white circle containing the number '0' on the right.</p>	<p>sets the transparency of the video stream to the specified number</p>

MUSIC BLOCK IMAGE	THIS BLOCK...
	<p>plays the specified drum for the specified number of beats</p>
	<p>rests for the specified number of beats</p>
	<p>plays the specified note for the specified number of beats</p>
	<p>sets the instrument to the one specified</p>
	<p>sets the tempo to the value specified</p>
	<p>changes the tempo by the number specified</p>
	<p>provides the program's tempo</p>

TEXT TO SPEECH BLOCK IMAGE	THIS BLOCK...
	<p>allows the specified text to be spoken</p>
	<p>changes the current voice used with Text to Speech blocks</p>
	<p>sets the language used with the Text to Speech blocks</p>

TRANSLATE BLOCK IMAGE	THIS BLOCK...
	<p>displays (translates) the specified text in the specified language</p>
	<p>displays translated text to or from the end user's set language</p>



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