



9-10 YEARS | WEEK 03

Technology-Algorithms And Robotics

1. Can you write it?

2. Drawing Robots Based on the Algorithm

3. Can you tell it?

4. Coding - Sequences

5. Coding - Basic terms

6. Coding - Algorithm

7. Computers - Hex codes

8. Computers - Binary code

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15. Coding - Pixel art

16. Robotics - History

17. Robotics - How robots move?

18. Robotics - Workshop

19. Robotics - Activities of a robot

20. Robotics - Design your robot

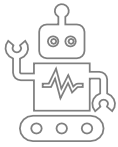


Can you write it



Write the commands to do the following tasks in LOGO.


1. Add number 4, 6, and 3 _____.
2. Multiply 5 with 9 _____.
3. Find the remainder of 6 divided by 3 _____.
4. For checking is 11 greater or 24 _____.
5. To remove the turtle from the screen _____.
6. To get the turtle back on the screen _____.
7. To move the turtle 75 steps ahead in the direction of its head _____.
8. To move the turtle 50 steps backwards _____.
9. To bring the turtle in the center of the monitor/screen _____.
10. To move the turtle without drawing any line _____.



Drawing Robots Based on the Algorithm

Let's use some imagination and creativity. Follow the given steps of the algorithm and design robots.

MY WEIRD ROBOTS

when RUN 

Draw the 2 robot heads

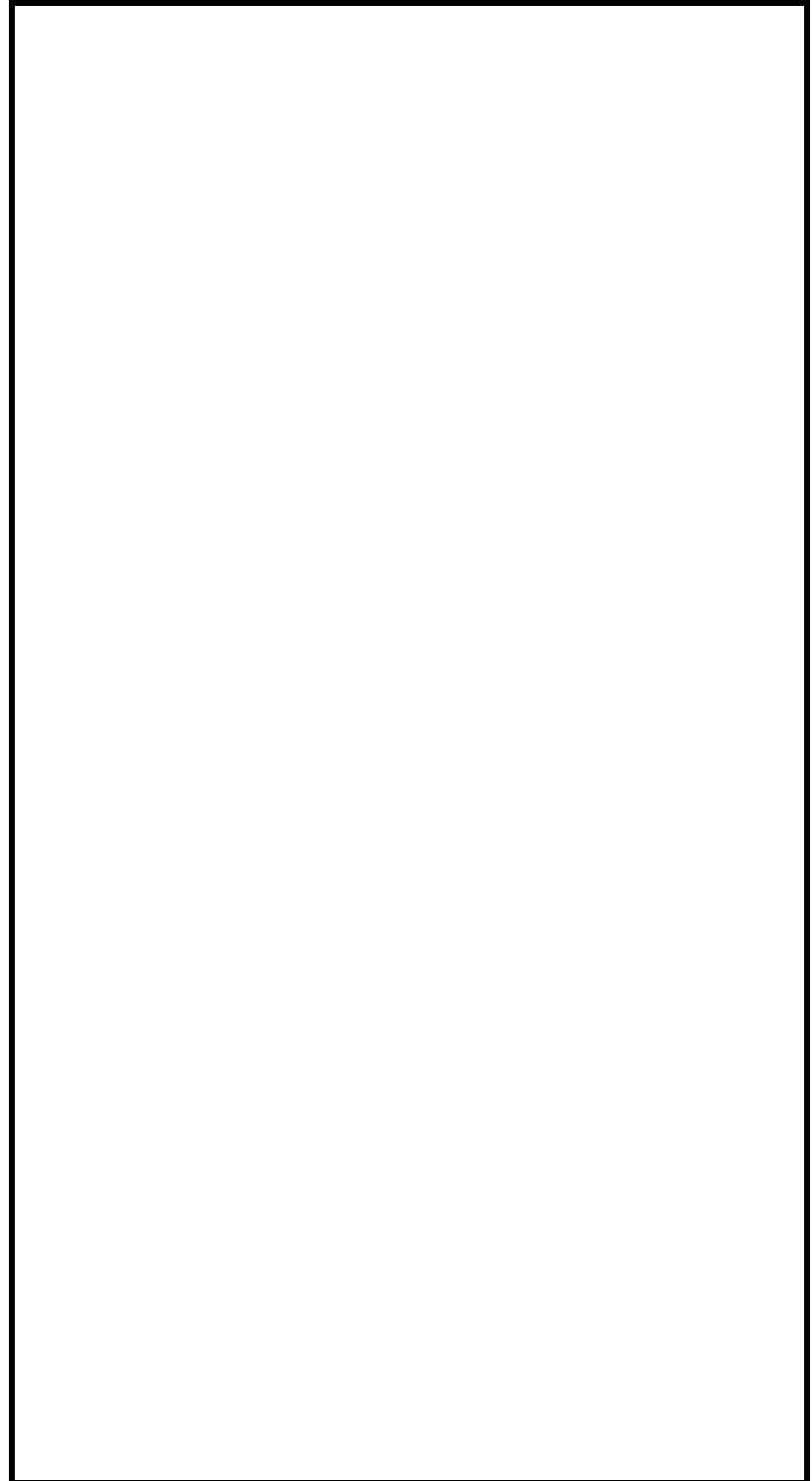
Draw the 2 robot necks

Draw the 2 robot bodies

Draw the 4 robot hands

Draw the 4 robot legs

Add details to the robots





Can you tell it



Where will the turtle land after following the below given commands? Keep an eye on the path, draw it with a pencil, then discuss with your friends if your shape and answer is correct. (1 unit = 1 cm)

a)

- Forward 5 units/cms
- Turn left
- Forward 4 units/cms



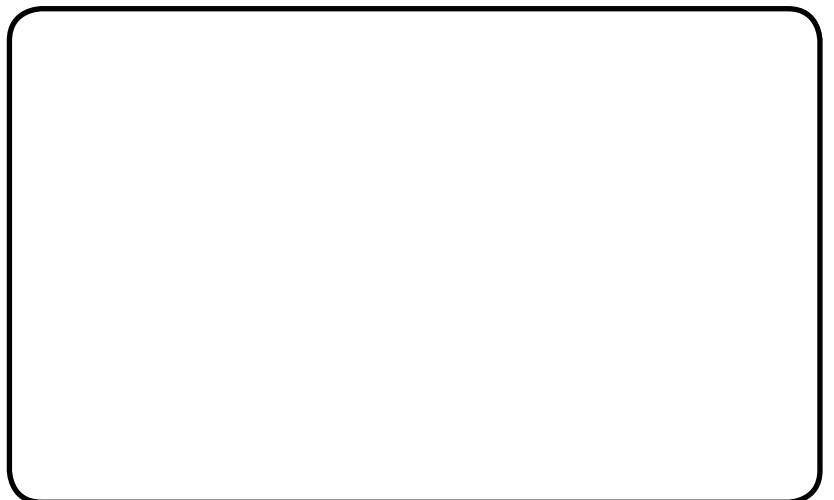
b)

- Backward 4 units/cms
- Turn right
- Forward 10 units/cms
- Backward 5 units/cms
- Turn right
- Forward 5 units/cms



c)

- Forward 7 units/cms
- Turn left
- Forward 5 units/cms
- Turn left
- Forward 7 units/cms
- Backward 6 units/cms



T: Coding - Sequences



A sequence can contain several instructions in such a way that they run in some specific order. Let us connect the planets in order of the solar system. Use the keys below to sequence the planets in the correct order.



Move right by one grid







Move up by one grid



Move left by one grid



Move down by one grid

 Earth			 Mars		 Pluto
				 Uranus	
		 Venus			
 Mercury			 Jupiter		
					 Neptune
 START				 Saturn	

Answer Key: Planets in order - Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune and Pluto.

T: Coding - Basic terms



Circle the words related to the basic coding terms by searching in the grids. The words can be horizontal, vertical or diagonal. The keywords can be used as a reference.

a	r	g	u	m	e	n	t	z	x
l	o	o	p	s	y	u	c	v	s
g	q	s	p	r	i	t	e	s	t
o	a	r	r	a	y	s	v	b	a
r	o	p	q	w	c	t	a	n	t
i	z	v	a	r	i	a	b	l	e
t	r	a	i	n	i	n	g	k	m
h	x	p	h	q	w	h	i	l	e
m	t	b	h	w	a	q	n	u	n
s	i	p	y	t	h	o	n	e	t
f	u	n	c	t	i	o	n	s	a

Answer Key: algorithm, argument, variable, while, arrays, functions, loops, statement, training, scripts, sprites, python.

T: Coding - Algorithm



An algorithm is a series of instructions to finish a task. A drawing algorithm has to be created to draw the intended picture. The key to creating the algorithm on the left with an example on the right is given below.

Programming key	
→	Step forward
←	Step backward
↓	Move downward
↑	Move upward
	Fill in the square with colours

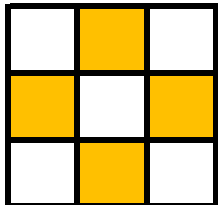
For example:

Step forward, step forward, fill in the square with colours.

The algorithm will be:



Write the algorithm in the box using the above key and the plain-English text.

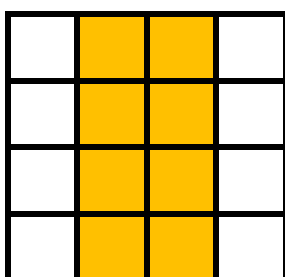
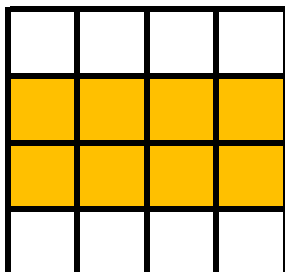


Step forward, fill in the square with colours, step forward, move downward, step backward, step backward.

Fill in the square with colours, step forward, step forward, fill in the square with colours, move downward, step backward, step backward.

Step forward, fill in the square with colours, step forward.

Write an algorithm using the key given in the table to draw exactly the image below.



T: Computers - Hex codes



Hex codes are specific codes used in computers. The given table will help you with a list of codes and corresponding letters. You will have to decode the codes given in the box below and find out the message! Are you ready?

a	b	c	d	e	f	g	h	i	j
51	52	53	54	55	56	57	58	59	5a

k	l	m	n	o	p	q	r	s	t
5b	5c	5d	5e	5f	61	62	63	64	65

u	v	w	x	y	z	.	,	!	space
66	67	68	69	6a	6b	6c	6d	6e	6f

58	59	6e	6f	59	6f	51	5d	6f	57	5f	59	5e	57	6f	65	5f	6f

65	55	5c	5c	6f	6a	5f	66	6f	51	6f	64	55	53	63	55	65	6c

Answer Key: h!l! am going to tell you a secret.

T: Computers - Binary code



You have seen so far many codes like hex codes, etc. Binary uses '2 numbers only' and the code is in the form of '0's' and '1's'. The letters of the alphabet in binary code is given in the table below. Can you try the binary code for your name?

Write the binary code in 0's and 1's beside each letter of your name.
Then shade the squares that equal '1' using pencils.



Your name is _____.					Key						
Example for letter Q - 10001											Binary '0' - no shade
										Binary '1' - shade	
Letter	Binary code					Colour as per the code					

Letters of the alphabet in binary code															
A - 00001	B - 00010	C - 00011	D - 00100												
E - 00101	F - 00110	G - 00111	H - 01000												
I - 01001	J - 01010	K - 01011	L - 01100												
M - 01101	N - 01110	O - 01111	P - 10000												
Q - 10001	R - 10010	S - 10011	T - 10100												
U - 10101	V - 10110	W - 10111	X - 11000												
	Y - 11001	Z - 11010													

T: Gadgets - Crack the binary code



Do you like to play a puzzle? Answer the following questions by cracking the codes using the key given below. Have fun playing!!!

1 How do you get straight A's?

10101 10011 00101

00001

10010 10101 01100 00101 10010

2 What kind of school do you go to if you are a giant?

01000 01001 00111 01000

10011 00011 01000 01111 01111 01100

3 I am tall when I am young and short when I am old.' Who am I?

00001

00011 00001 01110 00100 01100 00101

Letters of the alphabet in binary code

A - 00001	B - 00010	C - 00011	D - 00100
E - 00101	F - 00110	G - 00111	H - 01000
I - 01001	J - 01010	K - 01011	L - 01100
M - 01101	N - 01110	O - 01111	P - 10000
Q - 10001	R - 10010	S - 10011	T - 10100
U - 10101	V - 10110	W - 10111	X - 11000
	Y - 11001	Z - 11010	

Answer key: 1. Use a ruler. 2. High school. 3. A candle.



CODING - PIXEL ART

Let's create pixel art of hidden images ! Pick up your favorite two colors, C1, C2. Color each line as per instructions. Let's see what appears !

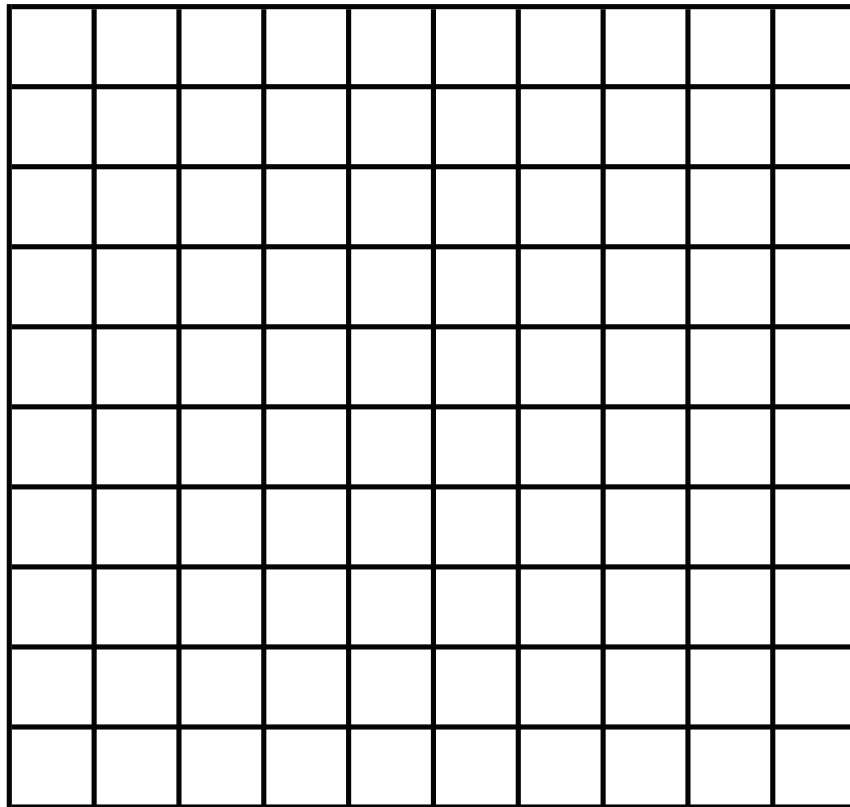
7-C1						
1-C1	2-C2	1-C1	2-C2	1-C1		
1-C2	2-C2	1-C2	2-C2	1-C2		
1-C2	5-C1	1-C2				
1-C2	5-C1	1-C2				
1-C1	1-C2	3-C1	1-C2	1-C1		
2-C1	1-C2	1-C1	1-C2	2-C1		
3-C1	1-C2	3-C1				
7-C1						

7-C1						
1-C1	1-C2	1-C1	1-C2	1-C1	1-C2	1-C1
2-C1	1-C2	1-C1	1-C2	2-C1		
1-C1	1-C2	1-C1	1-C2	1-C1	1-C2	1-C1
2-C1	1-C2	1-C1	1-C2	2-C1		
1-C1	1-C2	1-C1	1-C2	1-C1	1-C2	1-C1
2-C1	1-C2	1-C1	1-C2	2-C1		
1-C1	1-C2	1-C1	1-C2	1-C1	1-C2	1-C1
7-C1						



CODING - PIXEL ART

Let's create pixel art of hidden images ! Pick up your favorite two colors, C1, C2. Color each line as per instructions. Let's see what appears !



- ROW 1 4 → 2 Color Yellow 4 →
- ROW 2 4 → 1 Color Blue 1 Color Green 4 →
- ROW 3 3 → 4 Color Green 3 →
- ROW 4 3 → 2 Color Red 1 Color Blue 1 Color Green 3 →
- ROW 5 2 → 6 Color Green 2 →
- ROW 6 1 → 2 Color Green 1 Color Blue 5 Color Green 1 →
- ROW 7 1 → 8 Color Green 1 →
- ROW 8 3 Color Green 2 Color Red 2 Color Blue 3 Color Green
- ROW 9 4 → 2 Color Brown 4 →
- ROW 10 4 → 2 Color Brown 4 →



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7-C1		
3-C1	1-C2	3-C1
2-C1	2-C2	3-C1
3-C1	1-C2	3-C1
3-C1	1-C2	3-C1
3-C1	1-C2	3-C1
3-C1	1-C2	3-C1
2-C1	3-C2	2-C1
7-C1		

7-C1				
2-C1	3-C2	2-C1		
1-C1	1-C2	3-C1	1-C2	1-C1
5-C1	1-C2	1-C1		
4-C1	1-C2	2-C1		
3-C1	1-C2	3-C1		
2-C1	1-C2	4-C1		
1-C1	5-C2	1-C1		
7-C1				

7-C1				
1-C1	5-C2	1-C1		
4-C1	1-C2	2-C1		
3-C1	1-C2	3-C1		
4-C1	1-C2	2-C1		
5-C1	1-C2	1-C1		
1-C1	1-C2	3-C1	1-C2	1-C1
2-C1	3-C2	2-C1		
7-C1				



CODING - PIXEL ART

Let's create pixel art of hidden images ! Pick up your favorite two colors, C1, C2. Color each line as per instructions. Let's see what appears !

7-C1				
4-C1	1-C2	2-C1		
3-C1	2-C2	2-C1		
2-C1	1-C2	1-C1	1-C2	2-C1
1-C1	1-C2	2-C1	1-C2	2-C1
1-C1	5-C2	1-C1		
4-C1	1-C2	2-C1		
4-C1	1-C2	2-C1		
7-C1				

7-C1				
1-C1	5-C2	1-C1		
1-C1	1-C2	5-C1		
1-C1	4-C2	2-C1		
5-C1	1-C2	1-C1		
5-C1	1-C2	1-C1		
1-C1	1-C2	3-C1	1-C2	1-C1
2-C1	3-C2	2-C1		
7-C1				

7-C1				
3-C1	2-C2	2-C1		
2-C1	1-C2	4-C1		
1-C1	1-C2	5-C1		
1-C1	4-C2	2-C1		
1-C1	1-C2	3-C1	1-C2	1-C1
1-C1	1-C2	3-C1	1-C2	1-C1
2-C1	3-C2	2-C1		
7-C1				



CODING - PIXEL ART

Let's create pixel art of hidden images ! Pick up your favorite two colors, C1, C2. Color each line as per instructions. Let's see what appears !

7-C1		
1-C1	5-C2	1-C1
5-C1	1-C2	1-C1
4-C1	1-C2	2-C1
3-C1	1-C2	3-C1
2-C1	1-C2	4-C1
2-C1	1-C2	4-C1
2-C1	1-C2	4-C1
7-C1		

7-C1				
2-C1	3-C2	2-C1		
1-C1	1-C2	3-C1	1-C2	1-C1
1-C1	1-C2	3-C1	1-C2	1-C1
2-C1	3-C2	2-C1		
1-C1	1-C2	3-C1	1-C2	1-C1
1-C1	1-C2	3-C1	1-C2	1-C1
2-C1	3-C2	2-C1		
7-C1				

7-C1				
2-C1	3-C2	2-C1		
1-C1	1-C2	3-C1	1-C2	1-C1
1-C1	1-C2	3-C1	1-C2	1-C1
2-C1	4-C2	1-C1		
5-C1	1-C2	1-C1		
4-C1	1-C2	2-C1		
1-C1	3-C2	3-C1		
7-C1				

E: Robotics - History



Have you seen robots? Let us learn about the history of robots by reading the paragraph and answering the following questions below.

Robots

A robot is a human-like machine, which serves its creators. Some people perceive robots as a dangerous venture, yet Isaac Asimov, a Russian American writer, created stories of robots mentioning it as helpful servants of man, viewing them as 'a better, cleaner race'. He proposed three "Laws of Robotics". The earliest robots were created in the early 1950s by George C. Devol from Kentucky. He invented and patented a reprogrammable manipulator called "Universal Automation." He attempted to sell his product in the industry but did not succeed. In the late 1960s, businessman/engineer Joseph Engleberger acquired Devol's robot patent and was able to modify it into an industrial robot. For his efforts and successes, Engleberger is known in the industry as "the Father of Robotics." In 1958 at the Stanford Research Institute, Charles Rosen led a research team in developing a robot called "Shakey." Shakey could move around the room, observe the scene with his television "eyes," move across unfamiliar surroundings, and to a certain degree, respond to his environment.

1. What is a robot?

2. Who proposed the Laws of Robotics?

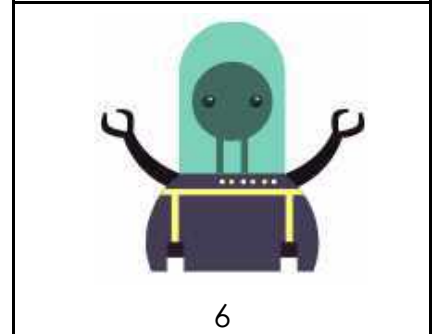
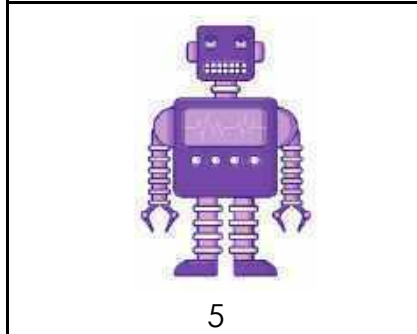
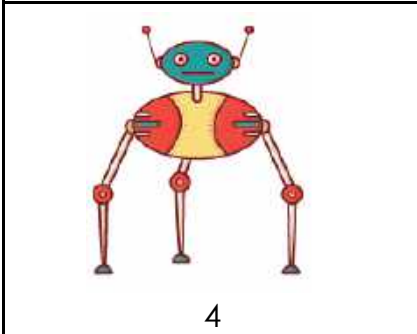
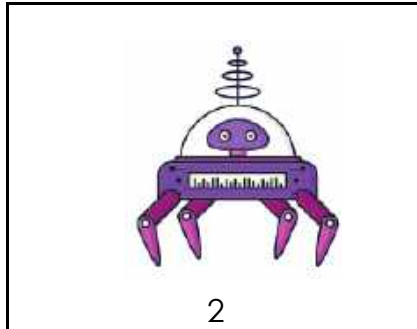
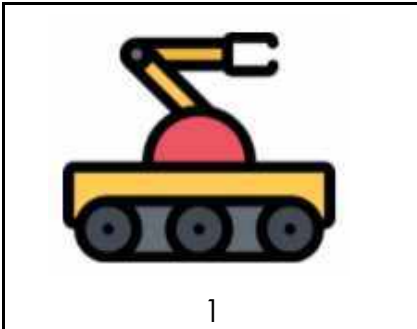
3. Who is the Father of Robotics?

4. What did the robot Shakey do?

E: Robotics - How robots move?



There are some robots, which have legs and some have wheels. As for how some can fly, some robots can swim too. Write the number in the boxes below that specify the location for which the robots can move around in.



Desert



Sea



Rocks



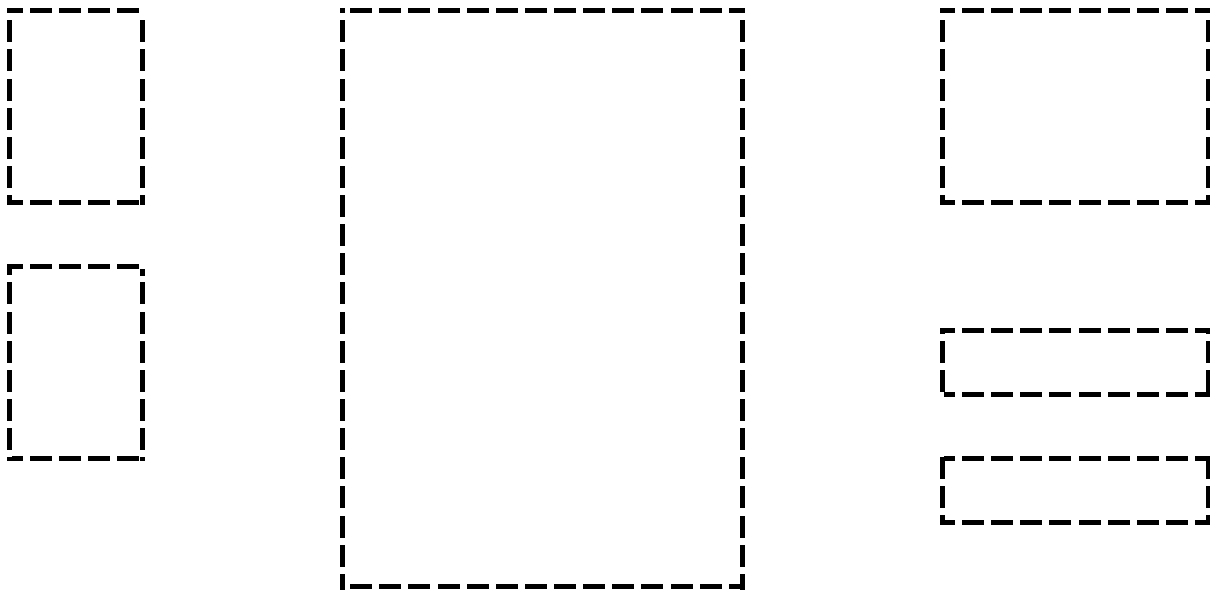
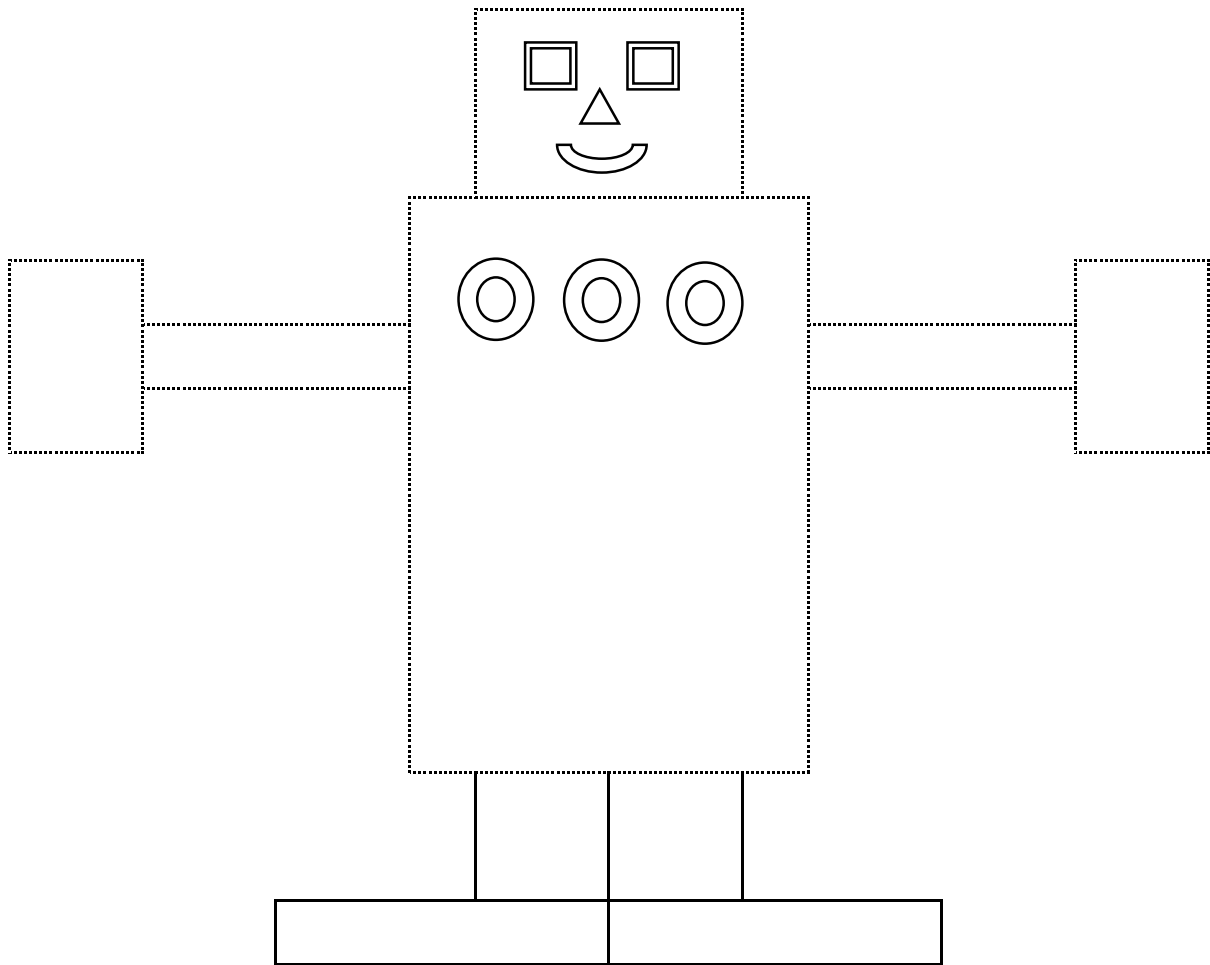
Stairs



E: Robotics - Workshop



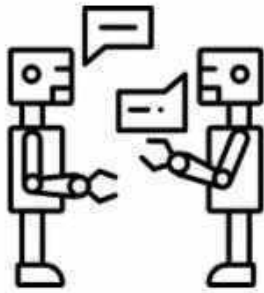
Let us do an activity in creating a robot. Cut along the dotted lines given below and paste them in the respective positions to make your robot. You can even colour it.



E: Robotics - Activities of a robot



Robots can help human beings in different ways. Do you know in which areas robots play a significant role? The robots can help the human race in working with the technologies, restaurants, research centres, household chores, malls, cinema theatres, making movies, and so on. Write the activities of the robots in the boxes below the picture.



1



2



3



4



5



6

Answer Key: 1. Communicate. 2. Work with devices. 3. Cook. 4. Serve food. 5. Clean the floor. 6. Run faster.

E: Robotics - Design your robot



Design your robot using the mathematical shapes and rulers in the given box below. It should have a minimum of ten geometrical 2d shapes. Draw the shapes creating a robot and also write the shapes used in the design of your robot at the side. You can even colour it. Get imaginative!!

My Robot!	Shapes used in my robot.

1. What is the name of your robot?

2. What can your robot do?
