Building the grabbing robot

The robot should look like the following figure:

Figure 14.2

Let's build the robot by following the given building instructions:

1. Take your BOOST Hub. Ensure that the batteries are fully charged:

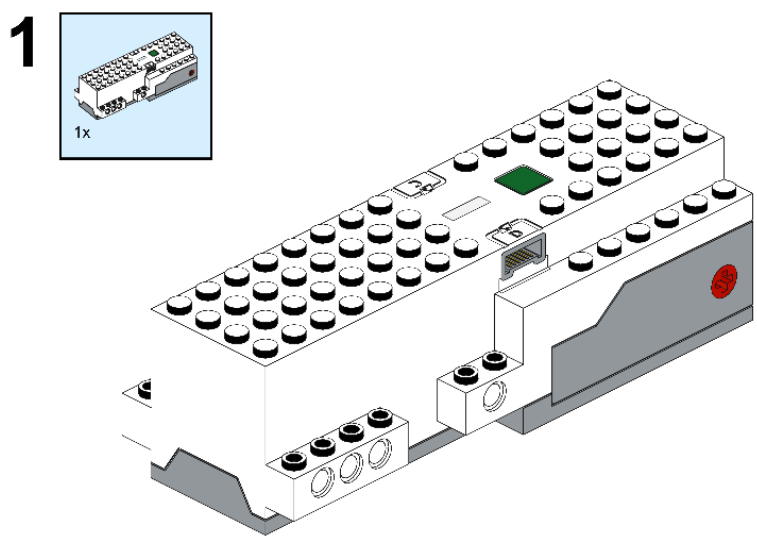


Figure 14.3

2. Take two 2x4 bricks and connect them to the hub:

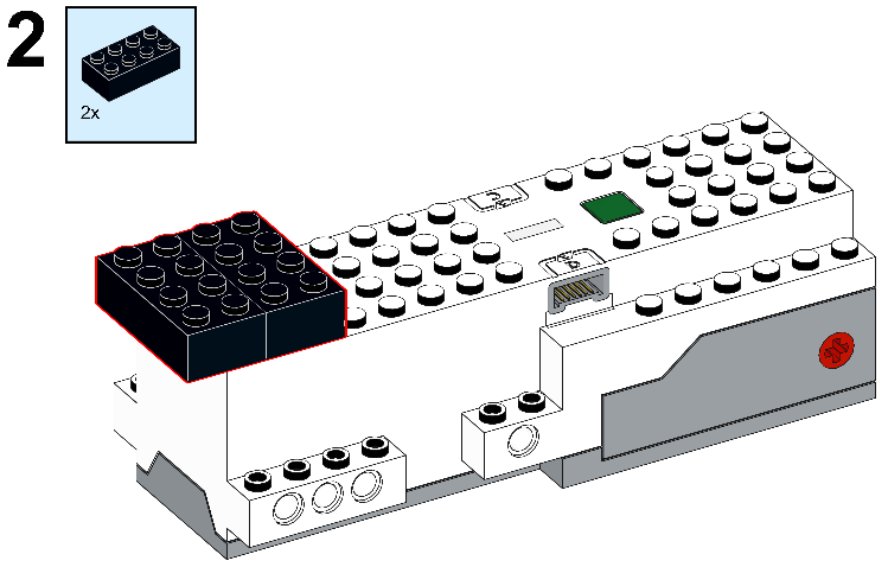


Figure 14.4

3. Take two 1x6 plates and connect them to both the bricks, as shown:

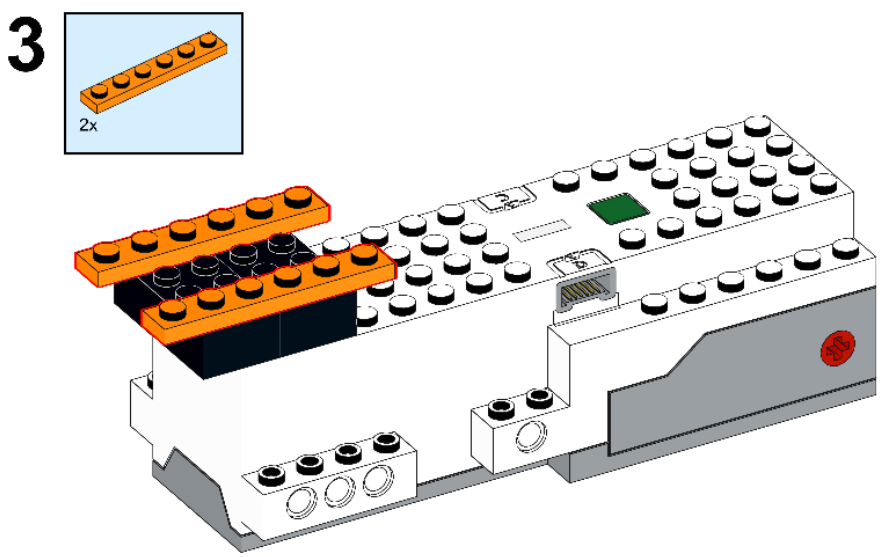


Figure 14.5

4. Take two 4x6 bricks and two 2x6 plates and connect them to the BOOST Hub, as shown in the following figure:

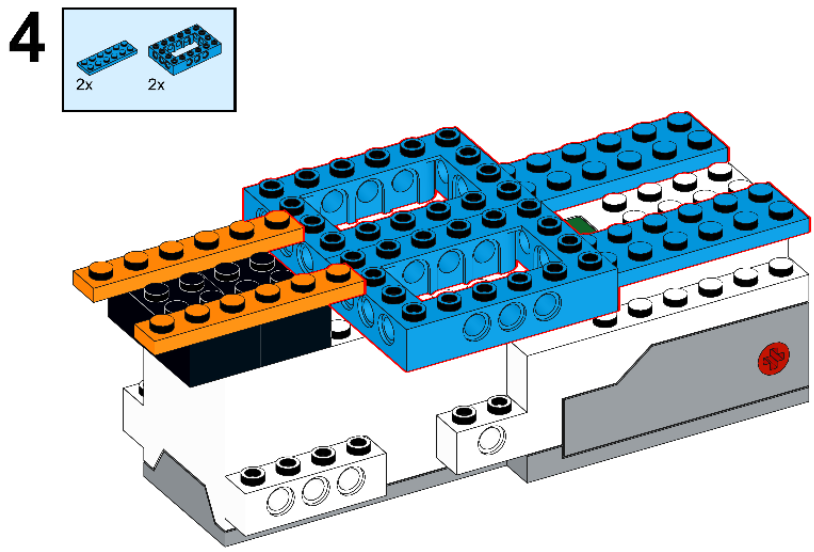


Figure 14.6

5. Take one external motor and connect it between the two orange plates, as shown in the following figure:

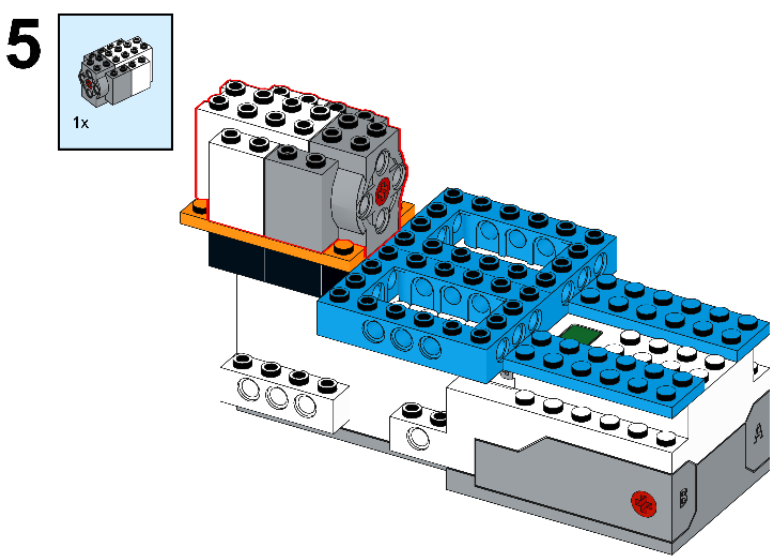


Figure 14.7

6. Take two 1x2 bricks, two 1x6 bricks, and two 1x8 flat tiles and connect them to both the 4x6 bricks, as shown in the following figure:

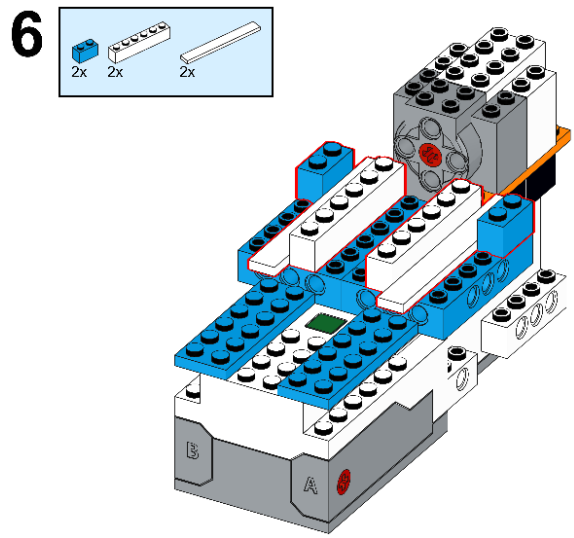


Figure 14.8

7. Then, take two 1x4 bricks and connect them beside the 1x2 bricks, as shown. Then, take two 1x3 bricks, two 1x2 bricks with a cross hole, and two 1x1 bricks and connect all of them to the 1x2 (blue-colored) and 1x4 (white-colored) bricks, as shown in the following figure:

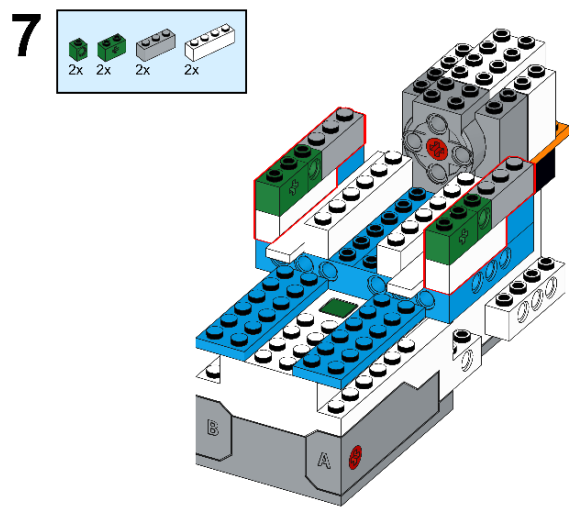


Figure 14.9

8. Now, take two 1x6 plates and connect them to both the stacks of bricks. Then, take two 1x2 flat tiles and connect them to both sides of the motor, as shown in the following figure:

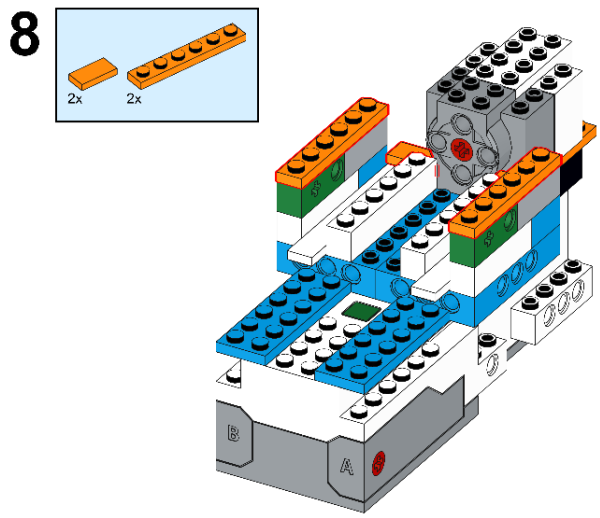


Figure 14.10

9. Then, take one T-beam with a 3x3 hole and place it at the front part of the motor, as shown in the following figure. Then, take two connector pegs with an axle and connect them to the T-beam, as shown in the following figure:

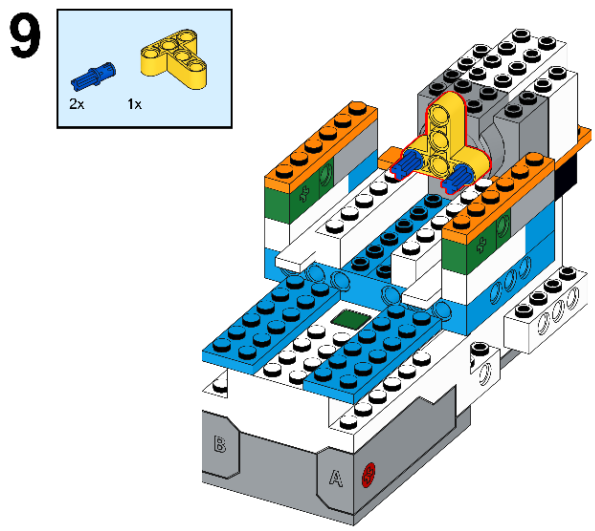


Figure 14.11

10. Take one 3M beam with a fork and connect it to the axle part of both the connector pegs:

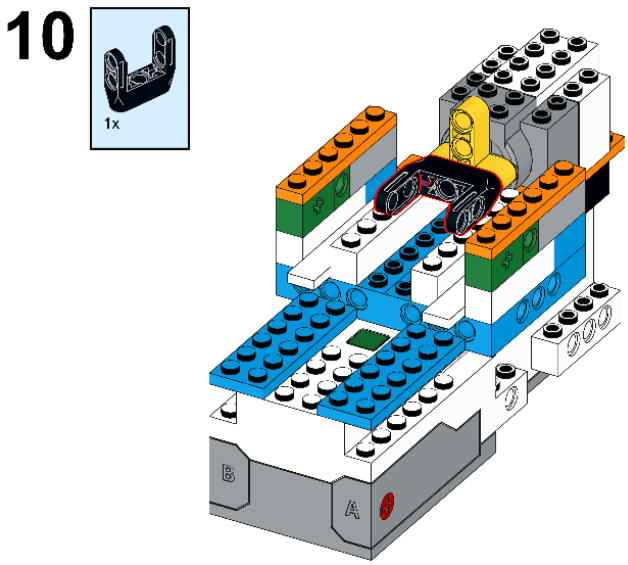


Figure 14.12

11. Now, take one 4M stopper axle and one 1M Z12 double conical wheel. Connect the double conical wheel to the axle and then connect that axle to the motor through the beam with a fork and the T-beam, as shown in the following figure:

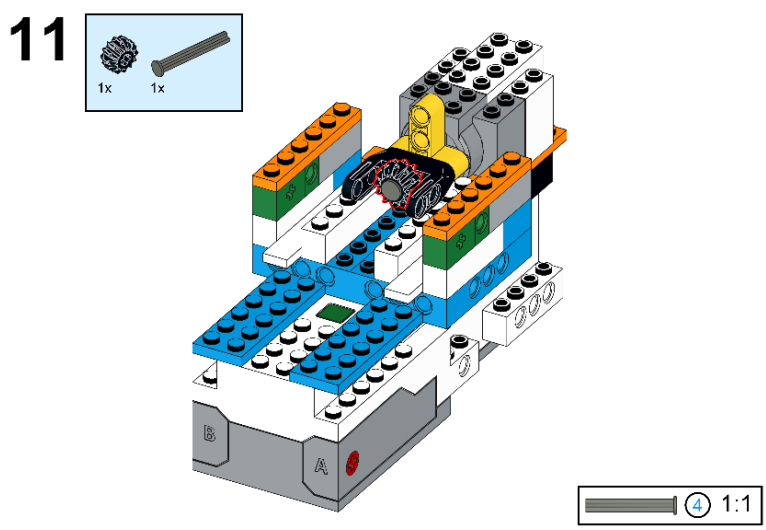


Figure 14.13

12. Now, we are going to make the sub-model that is shown in the top-right corner of the following figure. For that, start by taking two 1x8 plates:

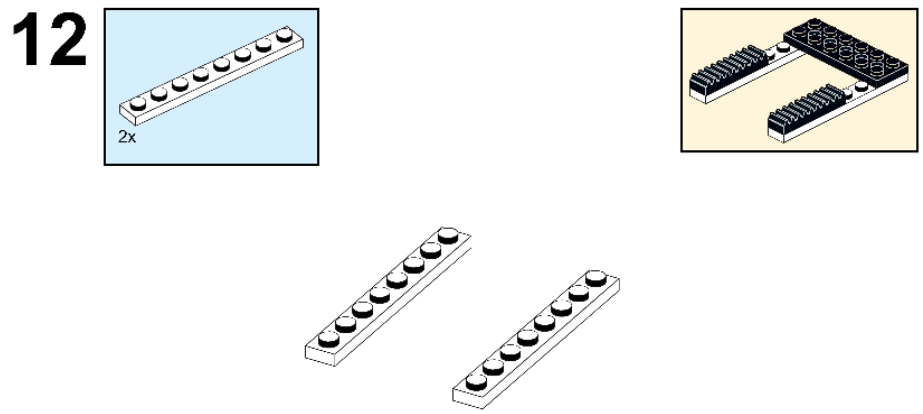


Figure 14.14

13. Then, take two 1M Z10 toothed bars and connect them to both the plates, so that half of the plate is covered:

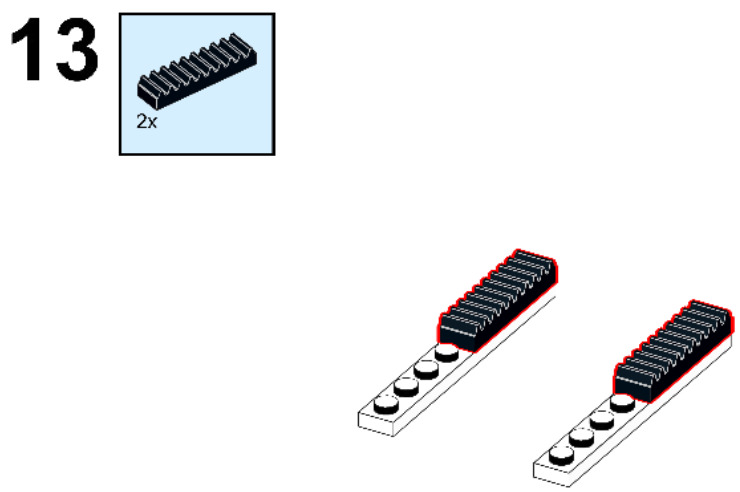
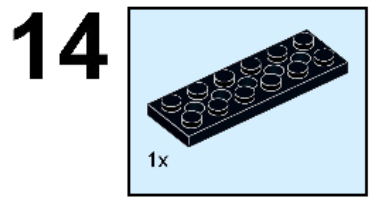


Figure 14.15

14. Then, take one 2x6 plate with holes and use it to connect both the 1x6 plates, as shown in the following figure:



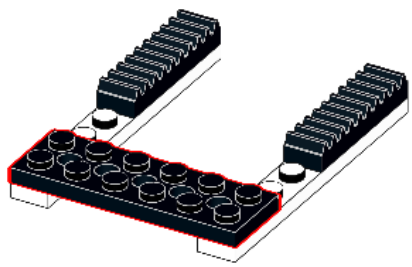


Figure 14.16

15. Check that your structure is looking as in the following figure:

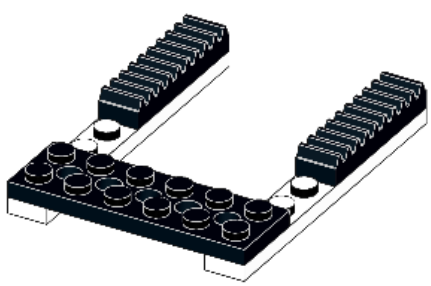


Figure 14.17

16. Now, place this on the 1x8 flat tiles, as shown in the following figure:

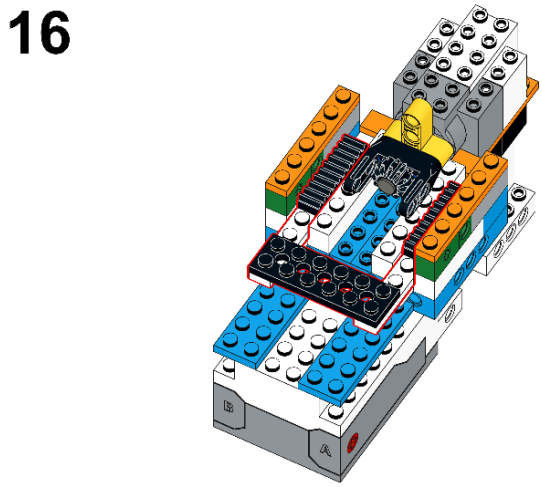


Figure 14.18

17. Then, take one 12M axle, one Z12 conical wheel, two 1/2 bushes, and two 1M 8T gear wheels. Now, connect all these things, the conical wheel, bushes, and gear wheels, to the axle, in such a way that the conical wheel meshes with the double conical wheel while both the gear wheels mesh with the toothed bar, as shown in the following figure.

    (Here, note that we are passing these axles through both the 1x1 bricks:)

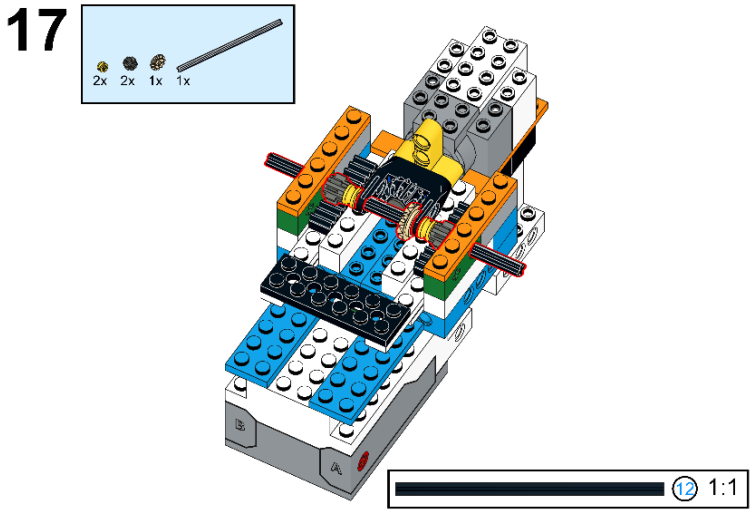


Figure 14.19

18. Take two 1x6 bricks and connect them to the BOOST Hub below the 2x6 plates, as shown here:

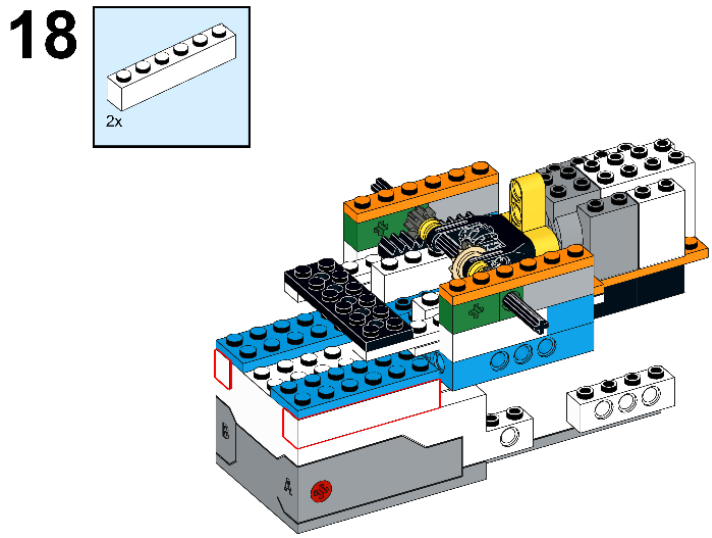


Figure 14.20

19. Now, take one 4x6 brick and connect it to the 2x6 plates, as shown. Then, take six 1x4 flat tiles and connect them to the brick so that they cover the whole brick:

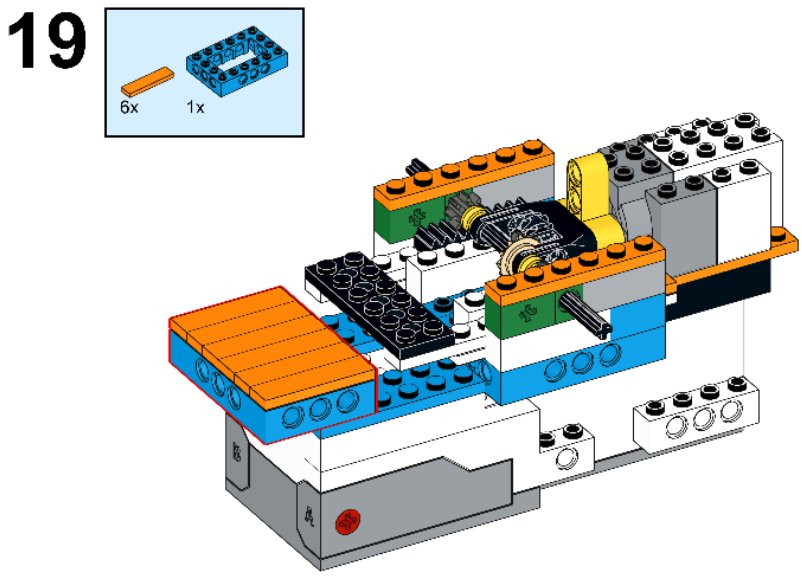


Figure 14.21

20. Then, take two 2x8 plates and connect them to both the 1x6 orange-colored plates:

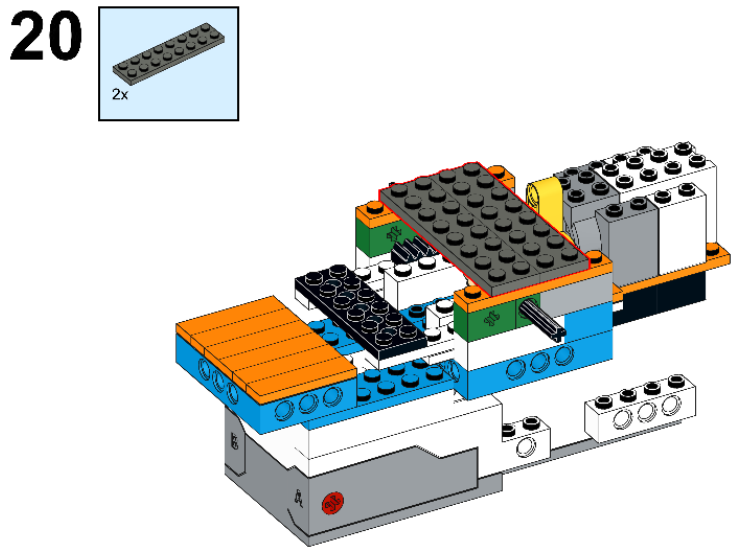


Figure 14.22

21. Take two 2x6 bricks with bows and one 2x2 inverted roof tile and connect them to the 2x6 plates, as shown in the following figure:

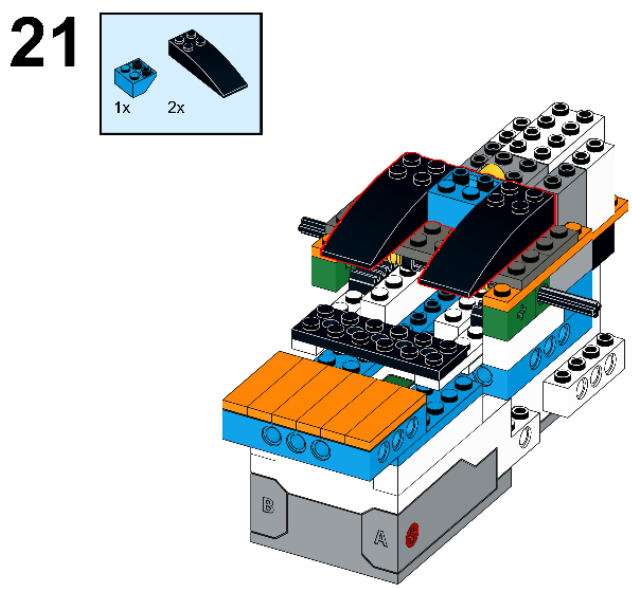


Figure 14.23

22. Take one 2x4 bearing element and two 2x4 plates and connect them to the bricks with bows and inverted roof tiles, as shown in the following figure:

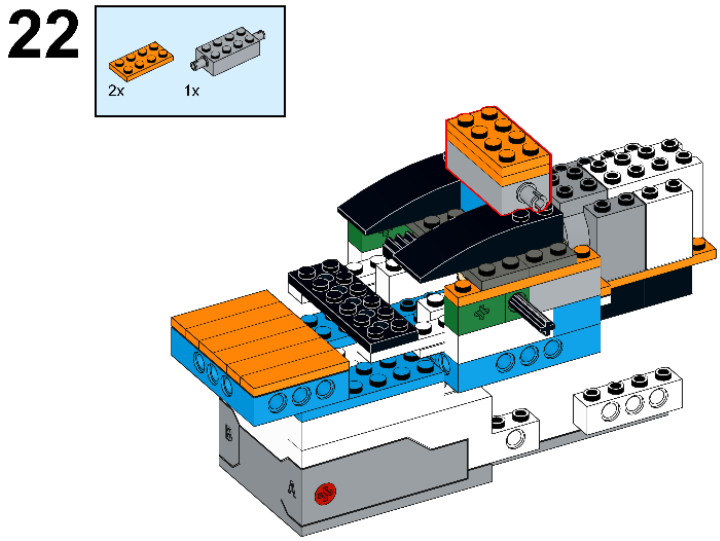


Figure 14.24

23. Again, take one 2x4 bearing element and connect it to the stack that we made before. Then, take two 2x2 bricks with a snap and cross and make a stack on the bearing element. Last, take two 1x2 bricks with a cross and connect them to both sides of the 2x2 bricks:

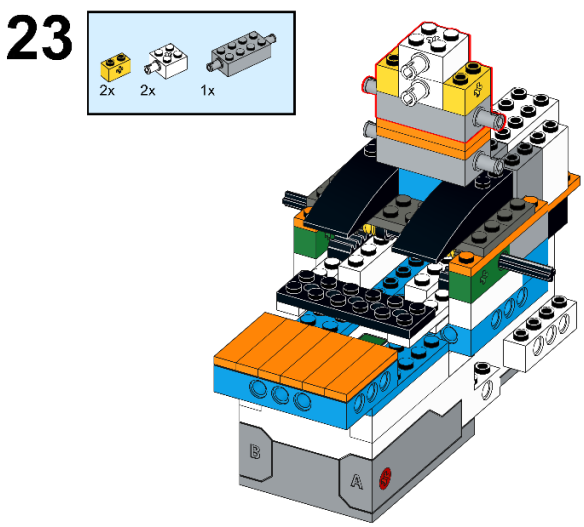


Figure 14.25

24. Now, take one 3x8x2 left shell and one 3x8x2 right shell and connect them to both the yellow-colored bricks with a cross, and then take two 1x2 plates and connect them to the left as well as the right shells.

    Then, take two 2x1 plates with a vertical holder and connect them to the 2x2 brick with a cross and bow, as shown in the following figure:

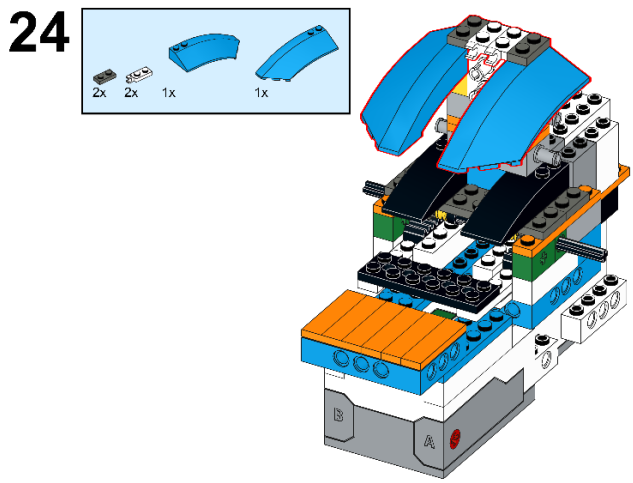


Figure 14.26

25. Take one 1x2 plate with a stick and connect it to the plates with a holder; place this plate vertically. Then, take one 2x4 plate and connect it to all four gray and white plates:

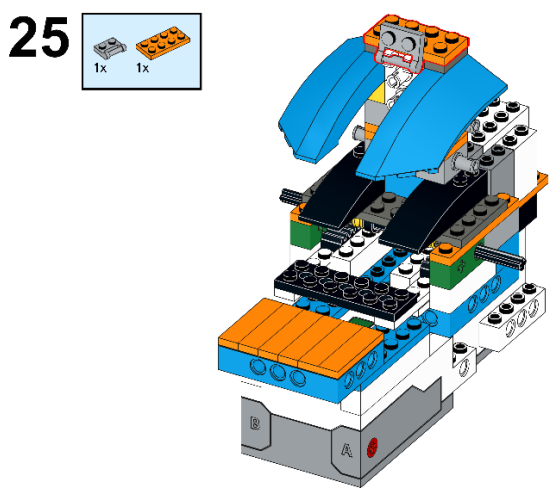


Figure 14.27

26. Take one 4x4 round plate with a snap and connect it to the plate with a stick, then take two 1x2 plates with a ball cup and connect them side by side on the round-shaped plates, as in the following figure:

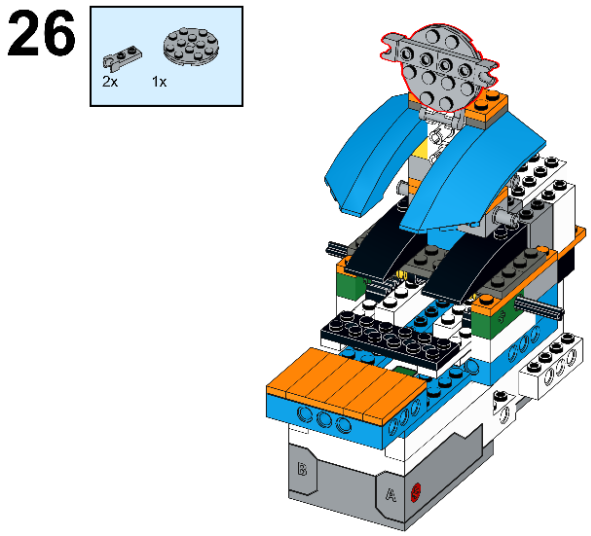


Figure 14.28

27. Take two 1x2x2/3 plates with a bow and connect them to both the plates with a ball cup, as shown in the following figure:

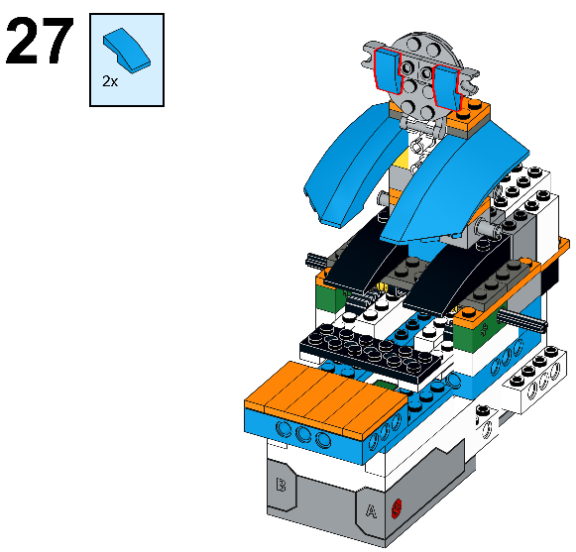


Figure 14.29

28. Now, take two 1x2 plates with a ball and connect them to the plates with a ball cup. Then, take two 2x2 plates with a knob and connect them to the round-shaped plate, below the plates with a ball cup:

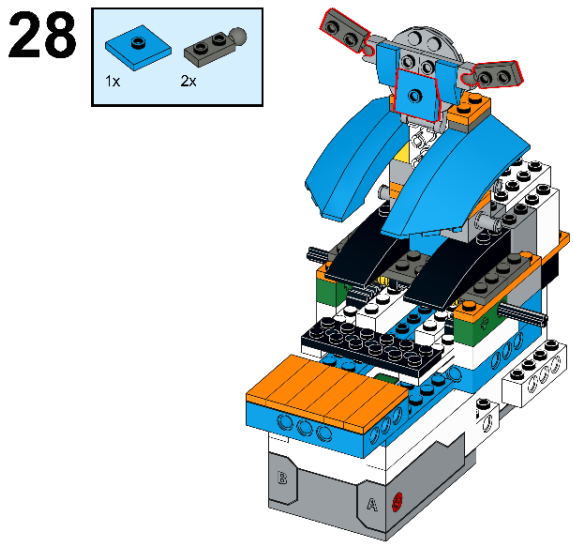


Figure 14.30

29. Take one 1x2x2/3 roof tile and connect it to the upper part of the round-shaped plate. Then, take two 1x4 plates with two knobs and connect them to the plates with a ball, as shown in the following figure:

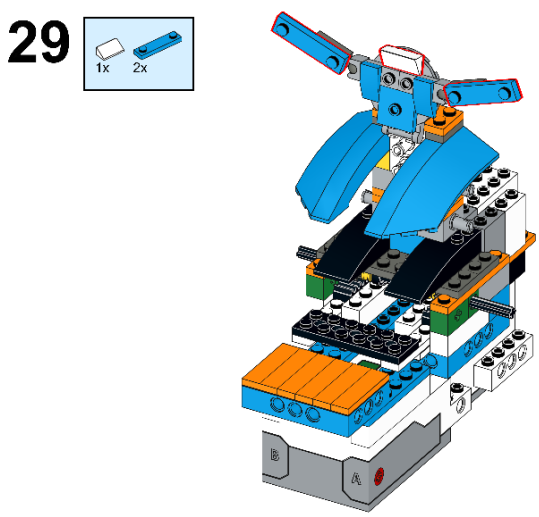


Figure 14.31

30. Now, take two satellite dishes and connect them to the second knob of both the plates with two knobs, as shown in the following figure:

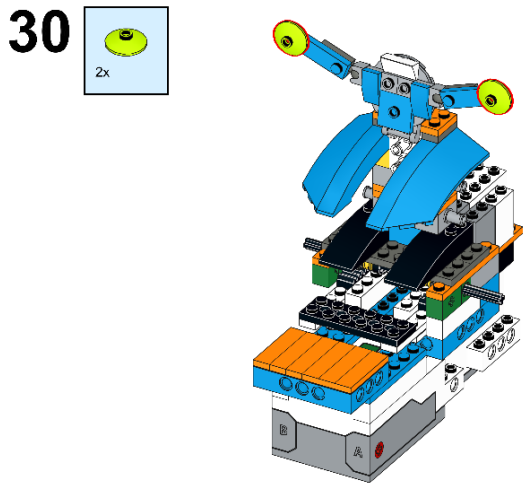


Figure 14.32

31. Now, let's make the front part of the robot. For that, start by taking two 1x2 bricks with a cross hole (green-colored) and two 1x2 bricks with a cross hole (red-colored), then place them in front of the BOOST Hub. Then, take one 2x8 plate and connect it to all four bricks.

    Make sure that the structure you have made looks like the one shown in the following figure:

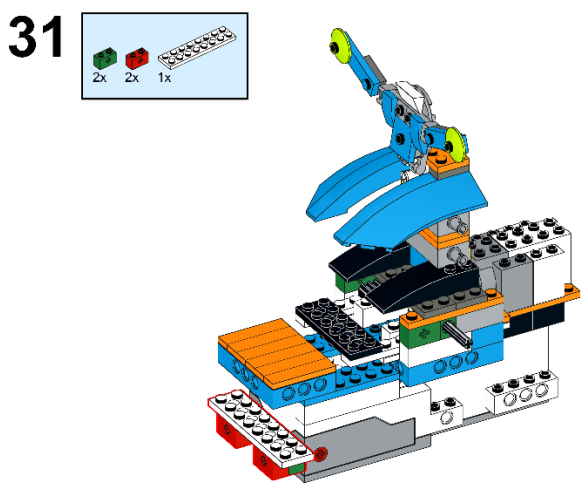


Figure 14.33

32. Now, take one more 2x8 plate and connect it under those bricks, then take two 5M axles with a 1M stop:

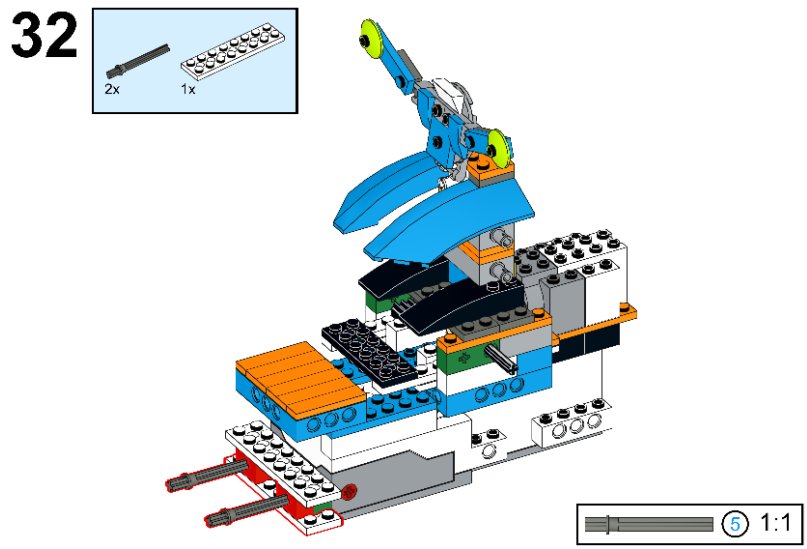


Figure 14.34

33. Take two 3x3x2 rocket steps with a cross and connect them to both the axles, as shown in the following figure:

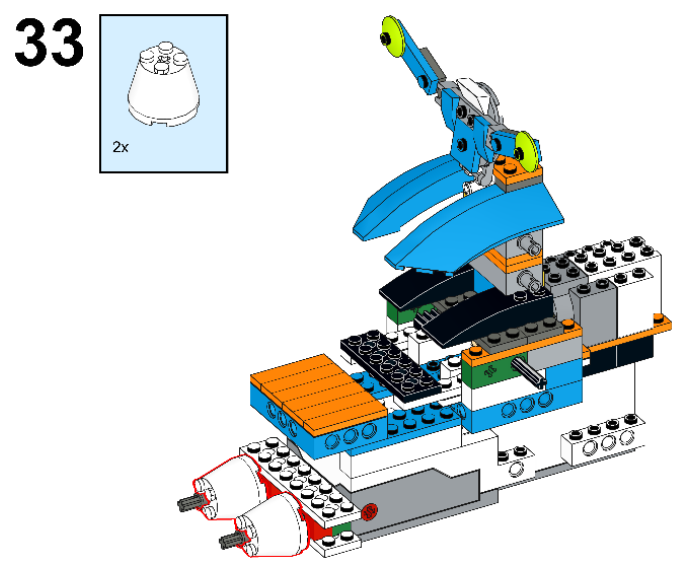


Figure 14.35

34. Take two design shape tubes with a cross hole and connect them to the 5M axle, as shown in the following figure. Now, take two 2M axles and connect them to the design shape tubes:

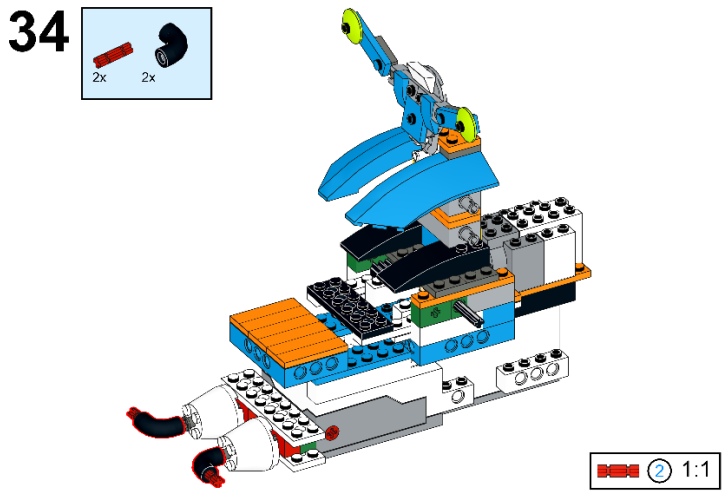


Figure 14.36

35. Again, take two design shape tubes with a cross hole and connect them to the 2M axles, then take two 4M axles and connect them to the design shape tubes, and then take two 2M dampers and connect them to the axles.

    Then, the front part looks like what is shown in the following figure. Here, remember that this front part is not connected to your main model; it is just placed there:

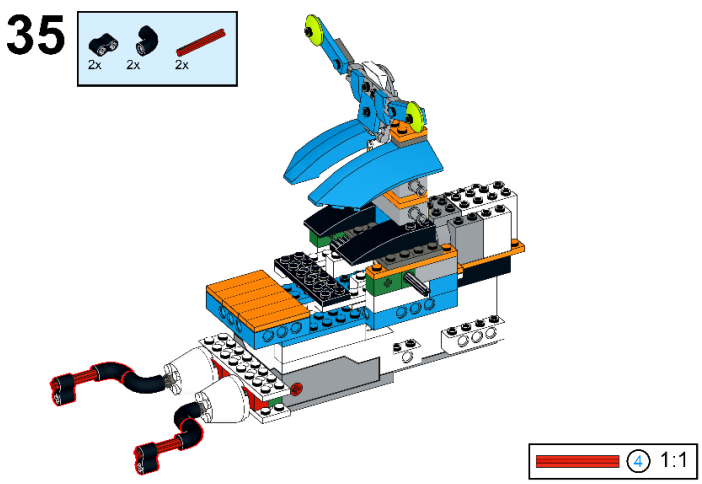


Figure 14.37

36. Take one 3M axle and connect it to motor A of the BOOST Hub, then take one connector peg and connect it to the side beam of the BOOST Hub, as shown in the following figure:

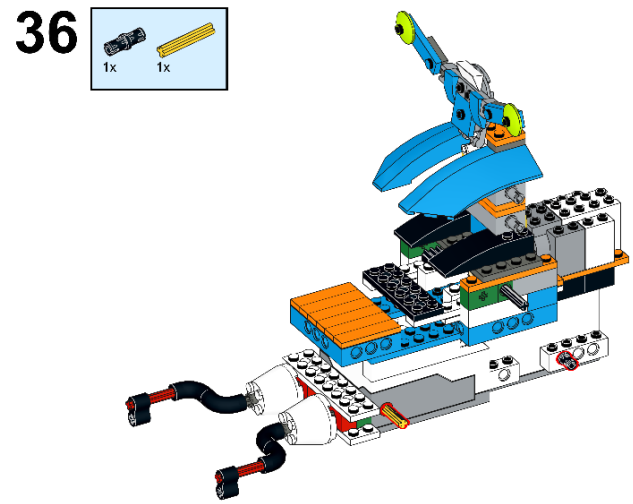


Figure 14.38

37. Take one 1x16 brick and connect it between both the 2x8 white-colored plates as well as to the 3M axle and the connector peg. Here, make sure that the last hole of the 1x16 brick will connect to the connector peg. (Now the front part is connected to the brick:)

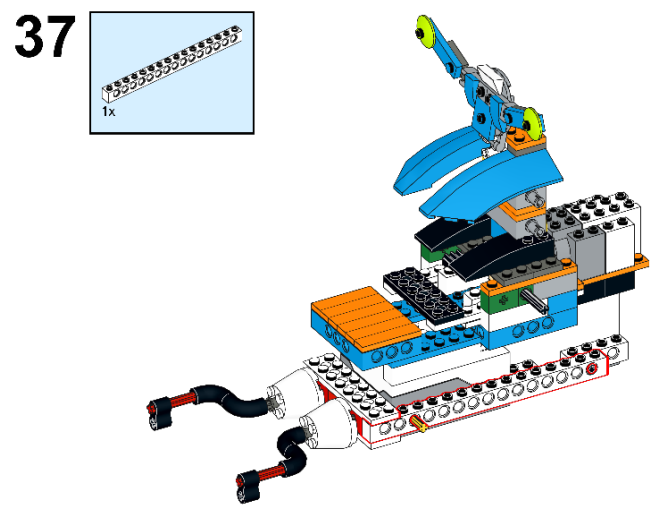


Figure 14.39

38. Take one connector bush with an axle and one 3M connector peg and connect them to the seventh hole and the eleventh hole of the 1x16 brick, respectively:

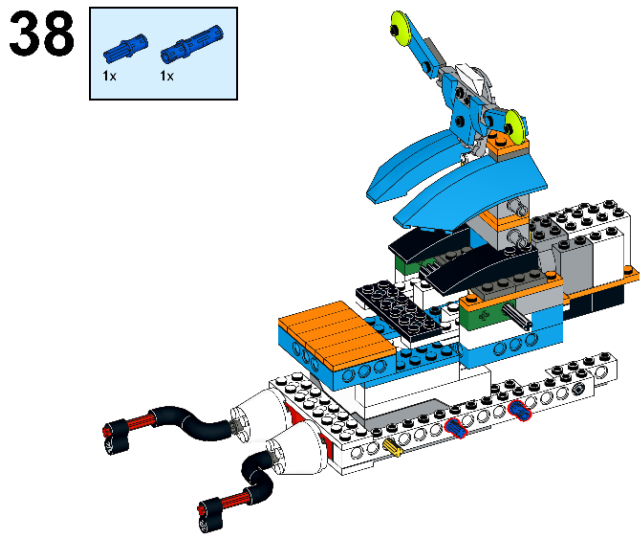


Figure 14.40

39. Now, take one axle extender, one 180-degree angle element, and one 3M beam and connect them to the 3M axle, the connector peg with an axle, and the 3M connector peg, respectively, as shown in the following figure:

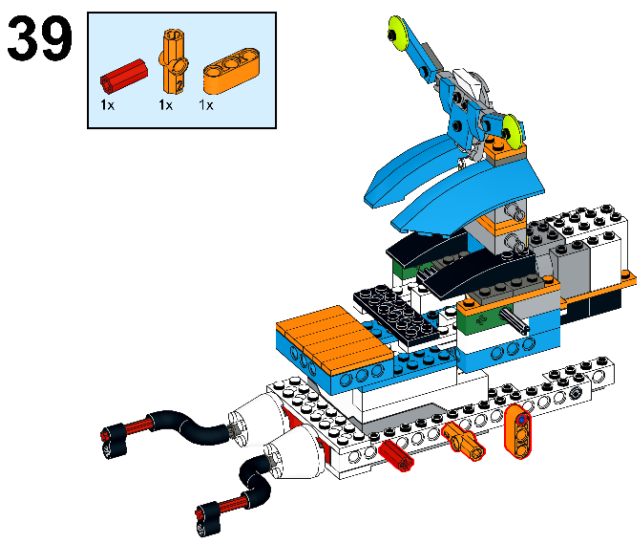


Figure 14.41

40. Take one 2M axle and one 7M axle, and connect the 2M axle to an angle element and the 7M axle to the second hole of the 3M beam:

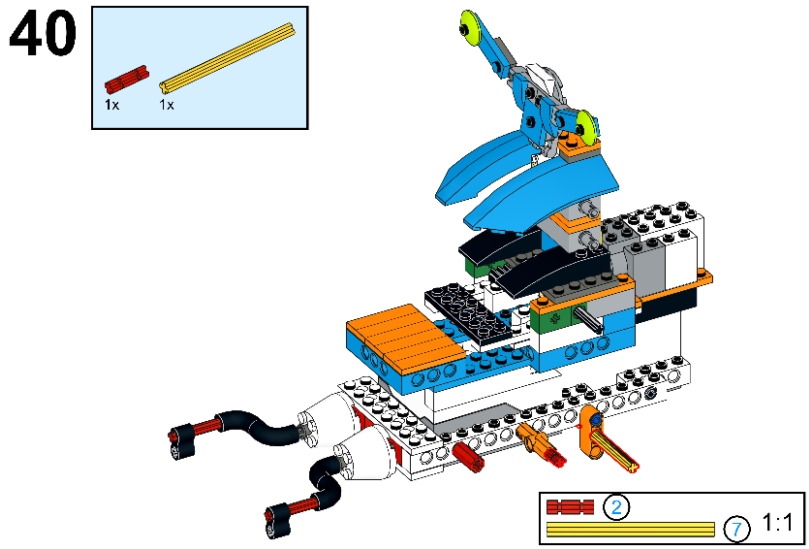


Figure 14.42

41. Now, take one 2M frictional snap with a cross hole and connect it to the 2M axle, then take two 1/2 bushes and connect them to the 7M axle:

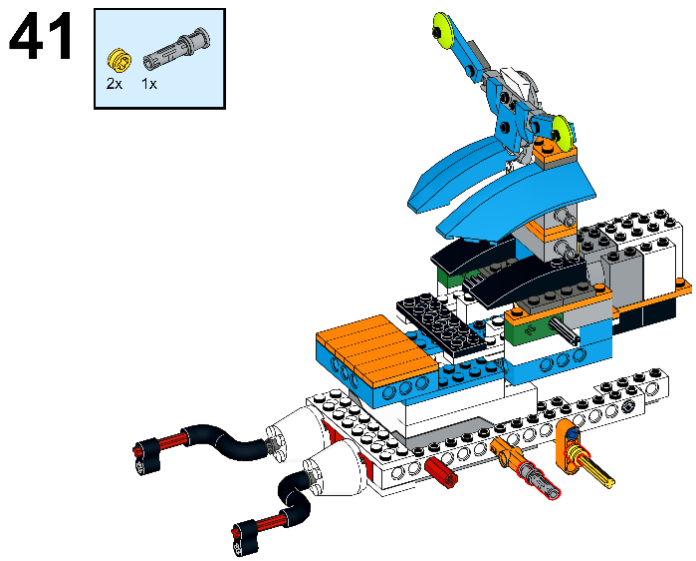


Figure 14.43

42. Take one sprocket (a small one) and one 1x1 beam and connect them to the 7M axle, as shown in the following figure:

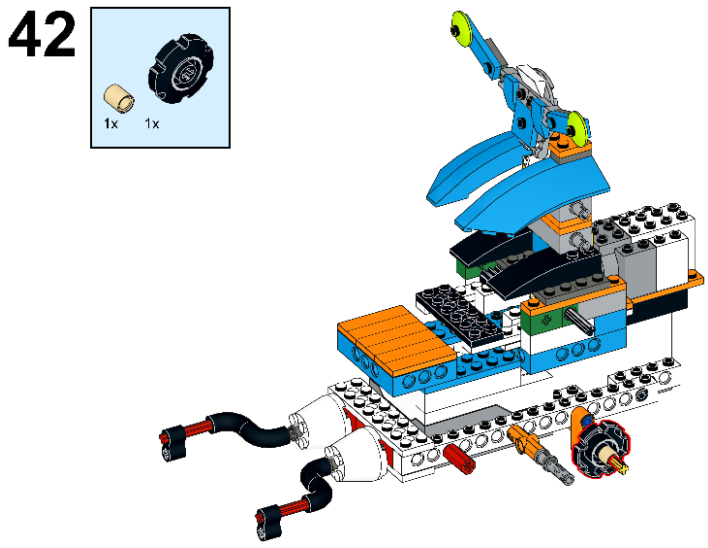


Figure 14.44

43. Take one 3x5 angular beam and connect it to the frictional snap with an axle and the 7M axle, as shown in the following figure. Then, take one connector peg and connect it to the angular beam:

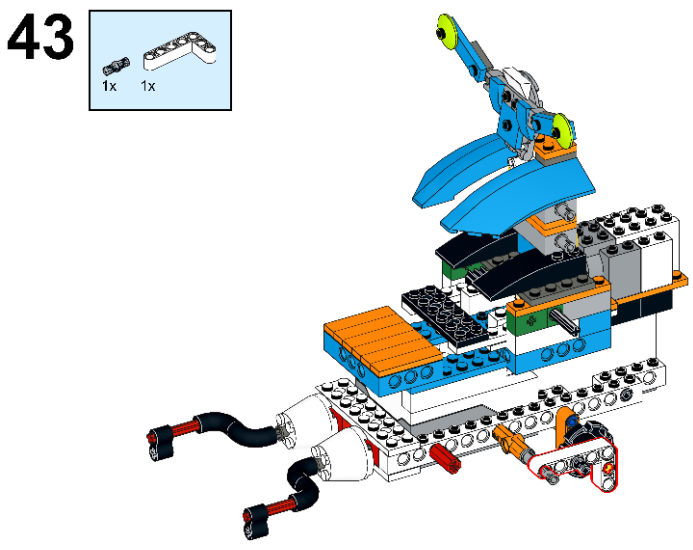


Figure 14.45

44. Now, take one sprocket (the bigger one) and place it beside the axle extender:

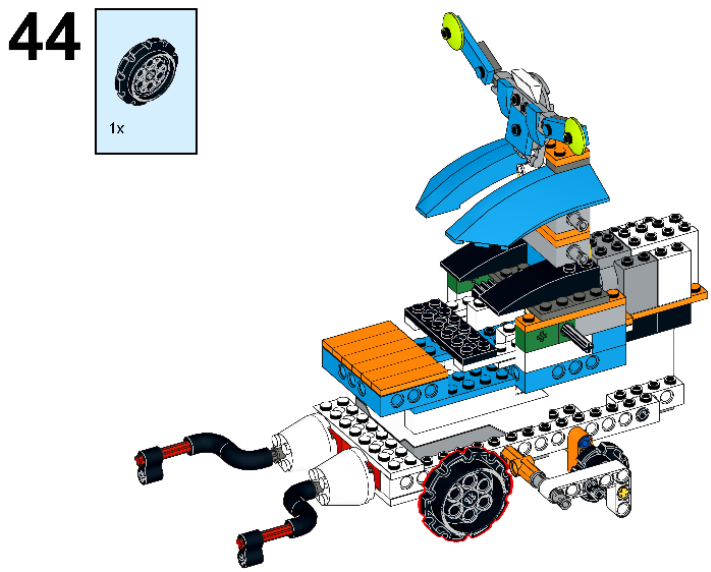


Figure 14.46

45. Now, take one 2x2 round flat tile with a hole, one 2x2 brick with a cross, and one 2x2 round-shaped plate and place them beside the sprocket in the same sequence as you took them:

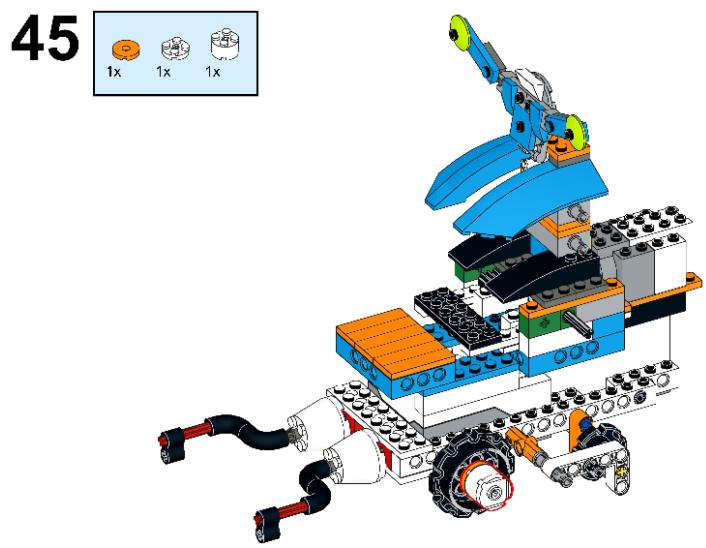


Figure 14.47

46. Take one 1x8 brick and connect the last hole of the brick to the connector peg, while the last third hole is connected to the frictional snap, as in the following figure:

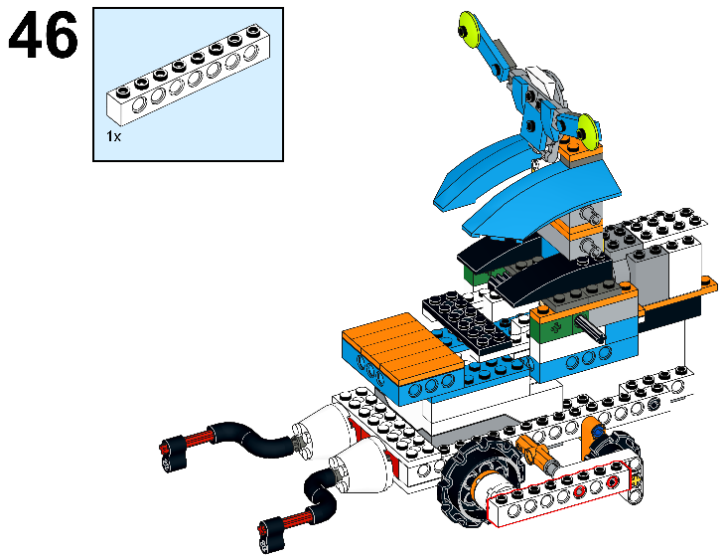


Figure 14.48

47. Take one 5M stopper axle and pass it through the first hole of the brick, then through the round plate, the brick with a cross, the round flat tile, and the sprocket, and then connect it to the axle extender:

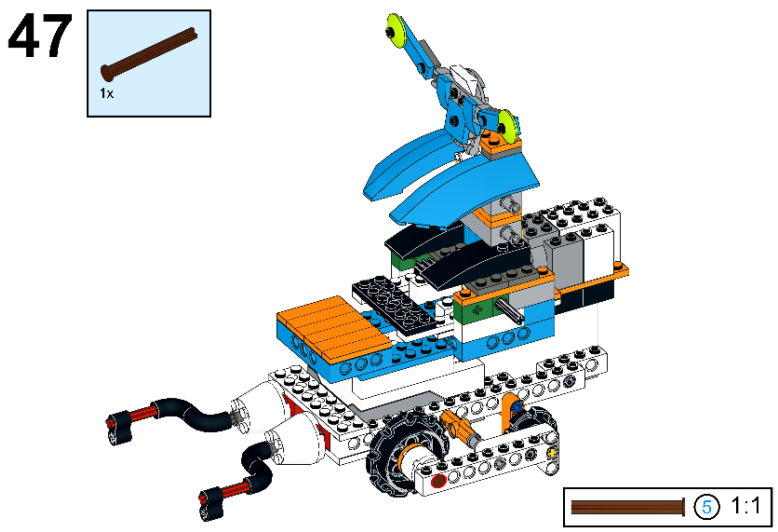


Figure 14.49

48. Now, flip the side of your model toward motor B of the hub. Here, once again, take one 3M axle and connect it to motor B of the BOOST Hub. Then, take one connector peg and one 3M connector peg and connect them on the same side, as shown in the following figure:

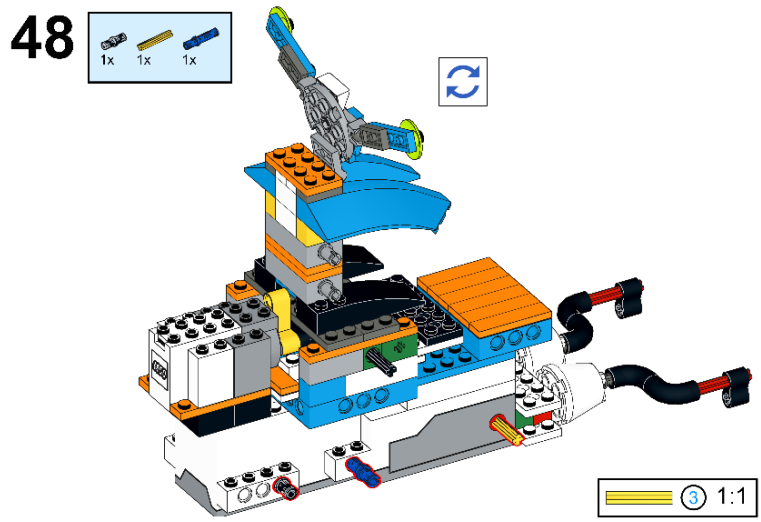


Figure 14.50

49. Take one 1x16 brick and connect it to the 3M axle, the connector peg, and the 3M connector peg. Then, take one connector bush with a cross axle and connect it to the brick, as shown in the following figure:

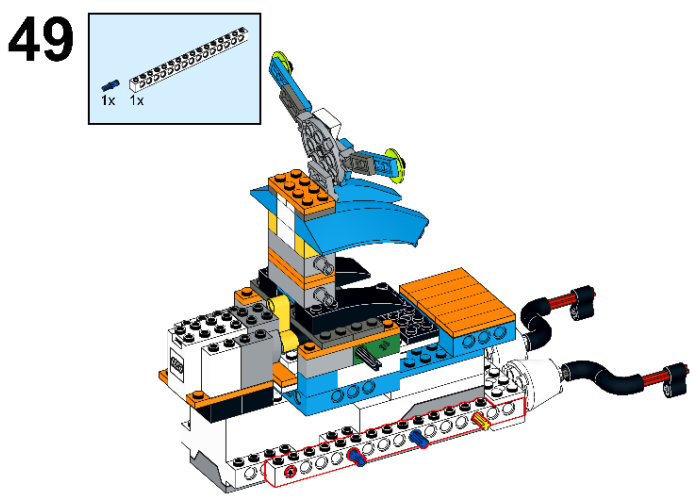


Figure 14.51

50. Now, take one axle extender, one 180-degree angle element, and one 3M beam and connect them to the 3M axle, the connector peg with an axle, and the 3M connector peg, respectively, as shown in the following figure:

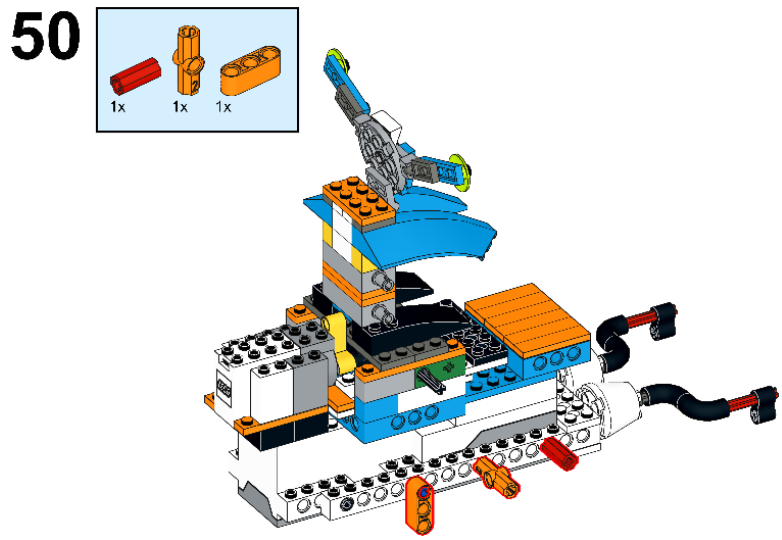


Figure 14.52

51. Take one 2M axle and one 7M axle and connect the 2M axle to the angle element and the 7M axle to the second hole of the 3M beam:

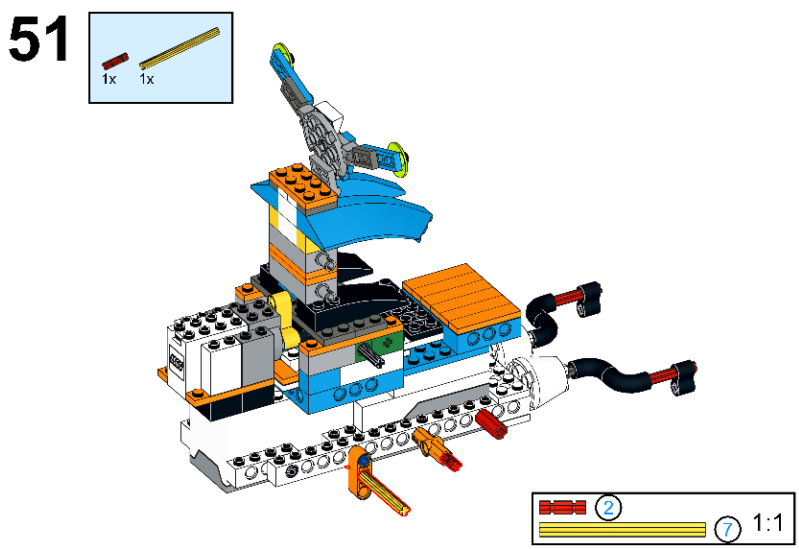


Figure 14.53

52. Now, take one 2M frictional snap with a cross hole and connect it to the 2M axle, and then take two 1/2 bushes and connect them to the 7M axle:

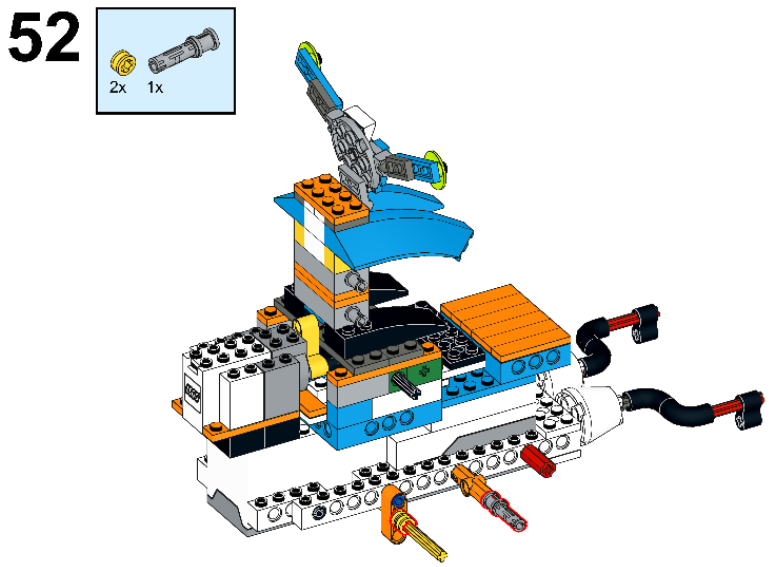


Figure 14.54

53. Take one sprocket (a small one) and one 1x1 beam and connect them to the 7M axle, as shown in the following figure:

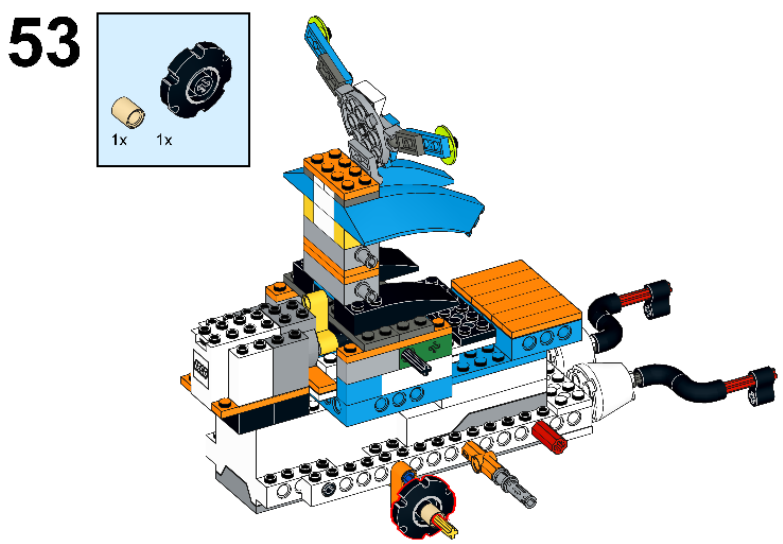


Figure 14.55

54. Take one 3x5 angular beam and connect it to the frictional snap with an axle and the 7M axle, as shown in the following figure. Then, take one connector peg and connect it to the angular beam:

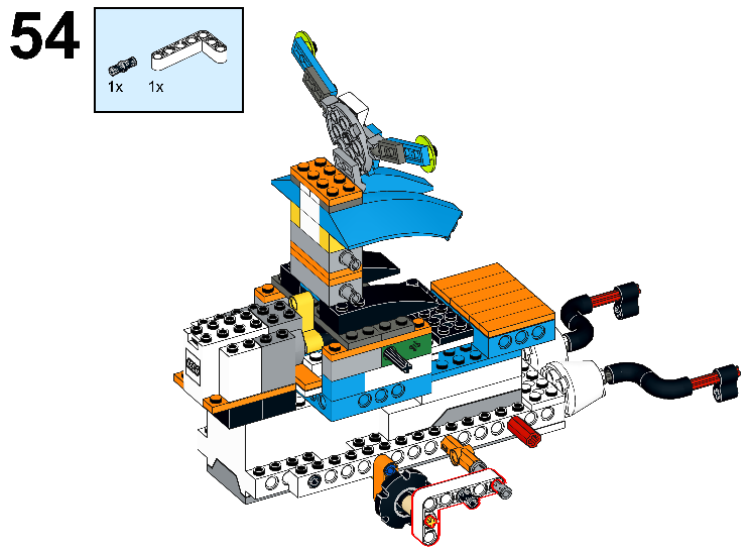


Figure 14.56

55. Now, take one sprocket (the bigger one) and place it beside the axle extender:

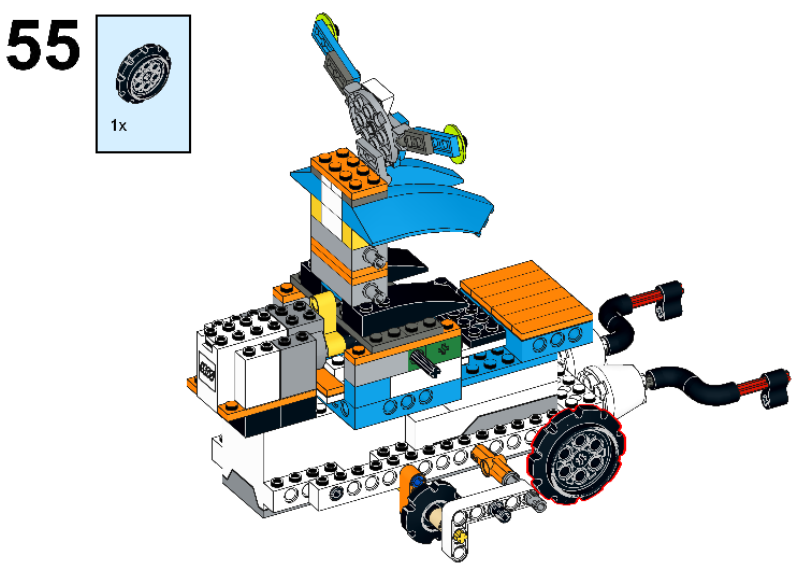


Figure 14.57

56. Now, take one 2x2 round flat tile with a hole, one 2x2 brick with a cross, and one 2x2 round-shaped plate and place them beside the sprocket in the same sequence as you took them:

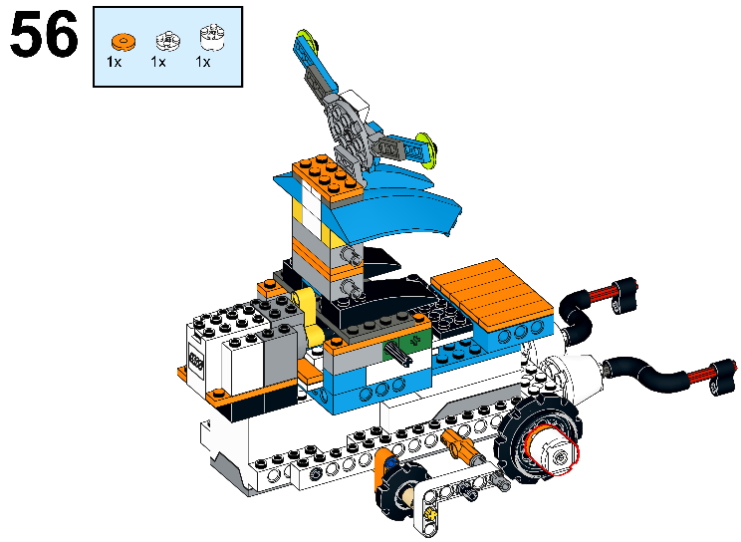


Figure 14.58

57. Take one 1x8 brick and connect the first hole of the brick to the connector peg and the third hole to the frictional snap, as shown in the following figure:

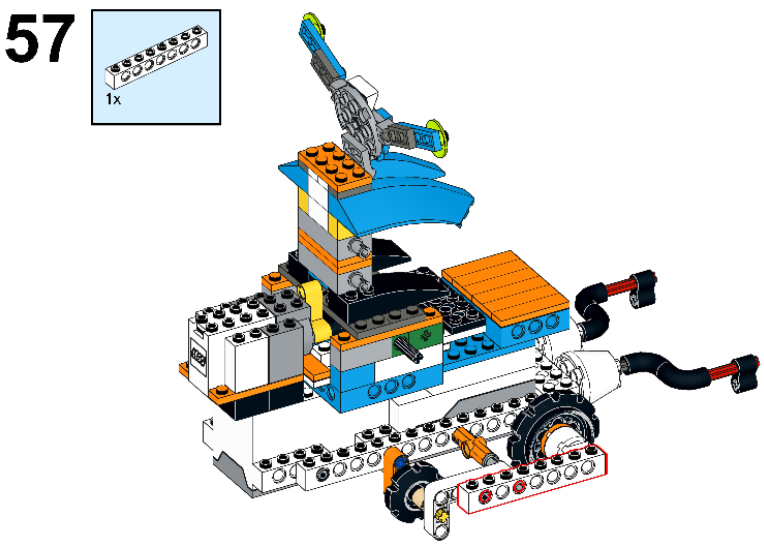


Figure 14.59

58. Take one 5M stopper axle and pass it through the first hole of the brick, then through the round plate, the brick with the cross, the round flat tile, and the sprocket, and then connect it to the axle extender:

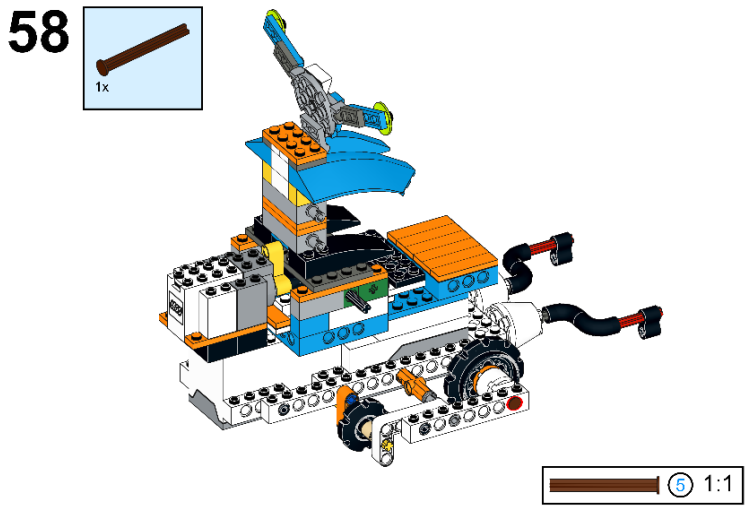


Figure 14.60

Again, flip the model.

59. Take one 2x2 brick with a cross and connect it to the center of the 2x6 black-colored plate, then take one 2x2 round flat tile with a hole and connect it to that brick:

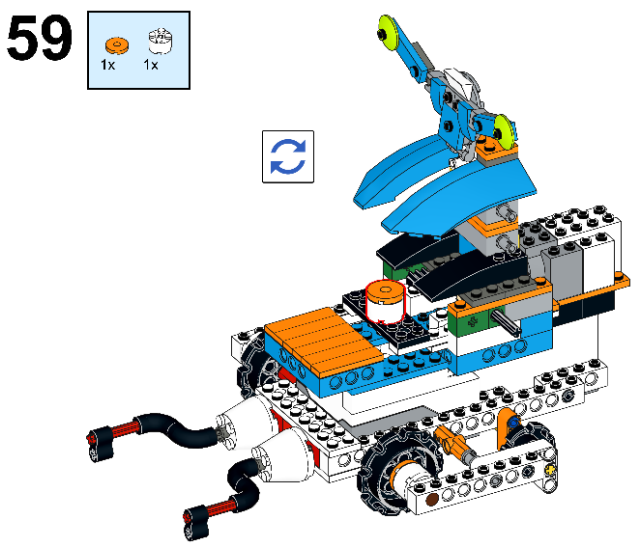


Figure 14.61

60. Now, let's make the front grabbing part of the robot, shown in the top-right corner of the following figure. Start by taking two 4x6 bricks and place them side by side in a vertical position, as shown in the following figure:

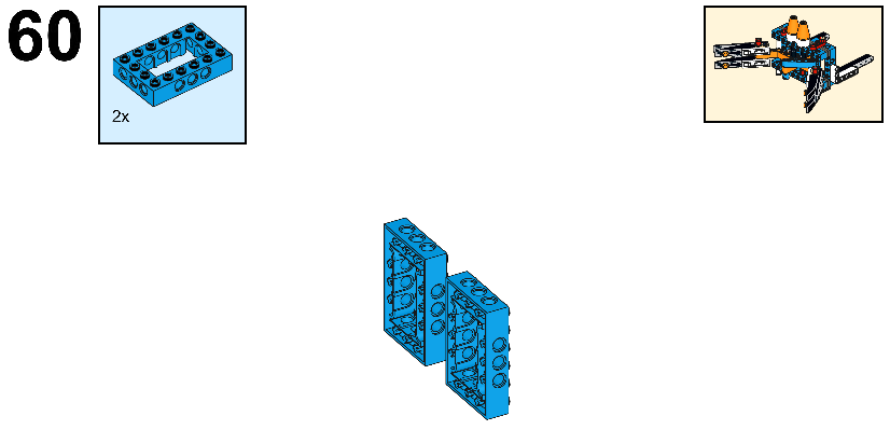


Figure 14.62

61. Take four 1x10 plates and connect two to the upper side and two to the lower side of the bricks, as shown in the following figure:

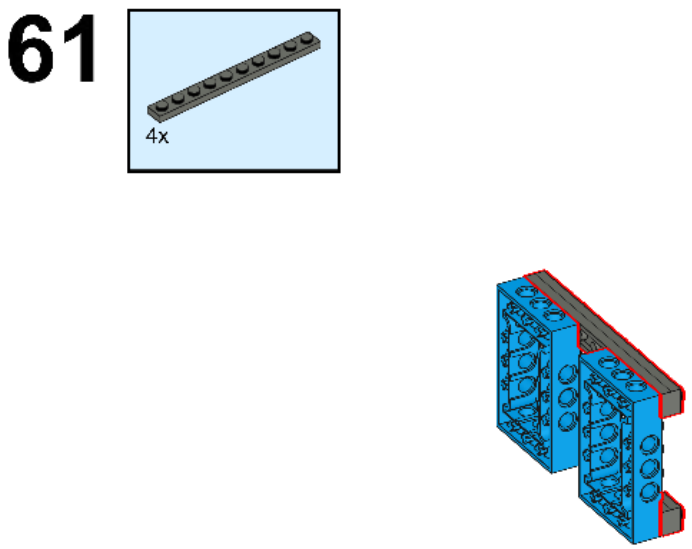


Figure 14.63

62. Take two 1x10 bricks and connect them to both stacks of plates:

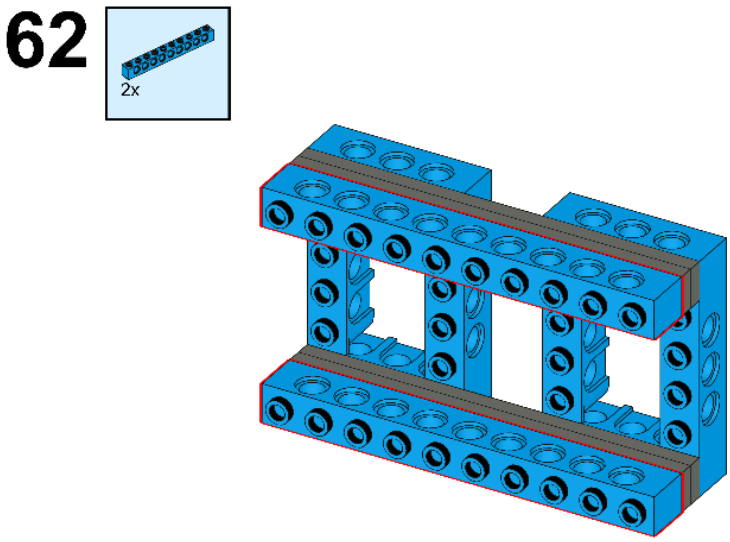


Figure 14.64

63. Take two connector pegs with an axle and connect them to the middle hole of both 4x6 bricks:

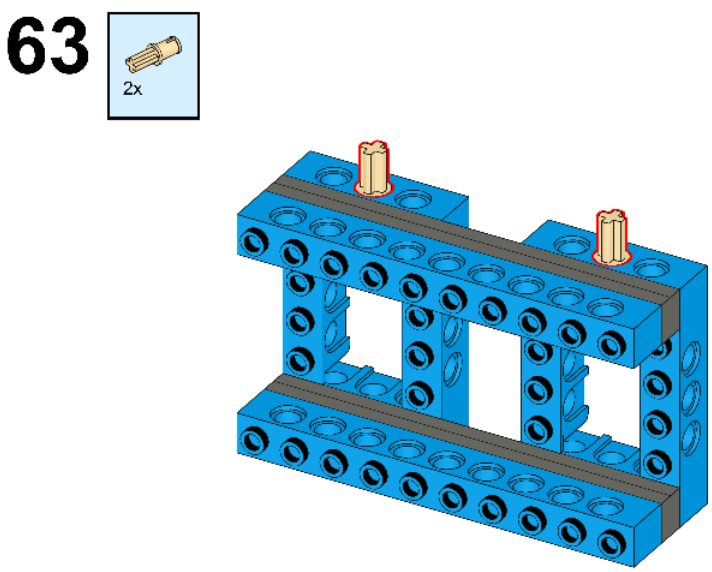


Figure 14.65

64. Now, take two 2x1x3 steering knuckle arms and connect them to the 1x10 bricks as well as the connector peg with an axle, as shown in the following figure:

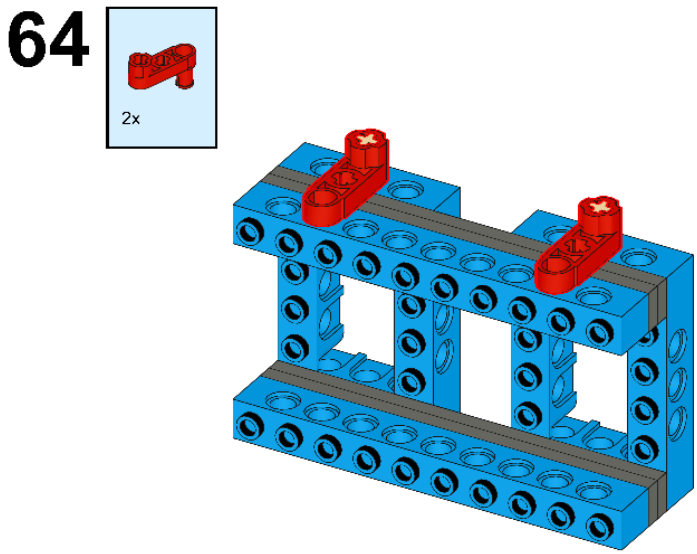


Figure 14.66

65. Now, flip the model so the bottom faces up and take four connector bushes with an axle and connect them to all four corners, as shown in the following figure:

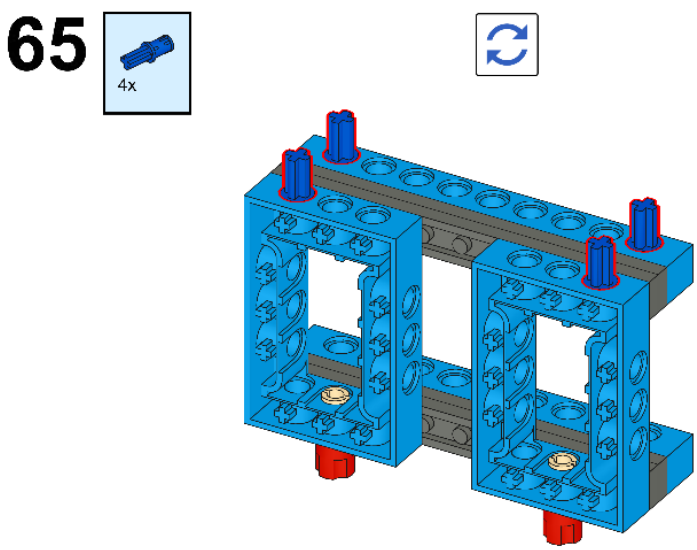


Figure 14.67

66. Take two double cross blocks and connect each of them to two connector bushes with an axle, as shown in the following figure:

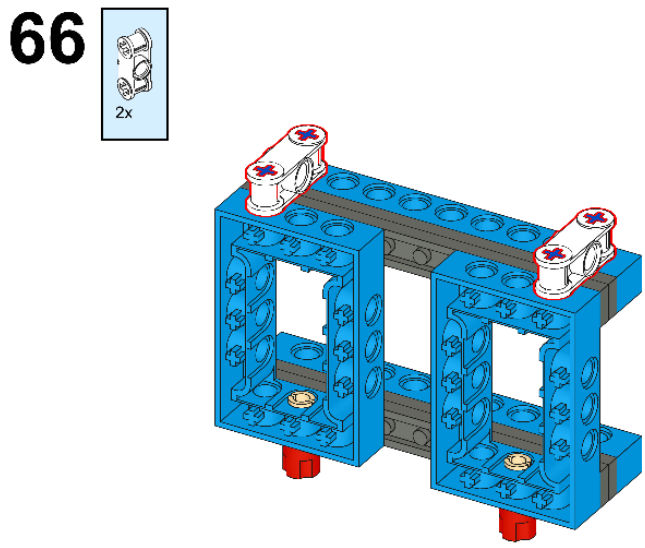


Figure 14.68

67. Now, take four connector pegs and connect them on both sides (two on each side), as shown in the following figure:

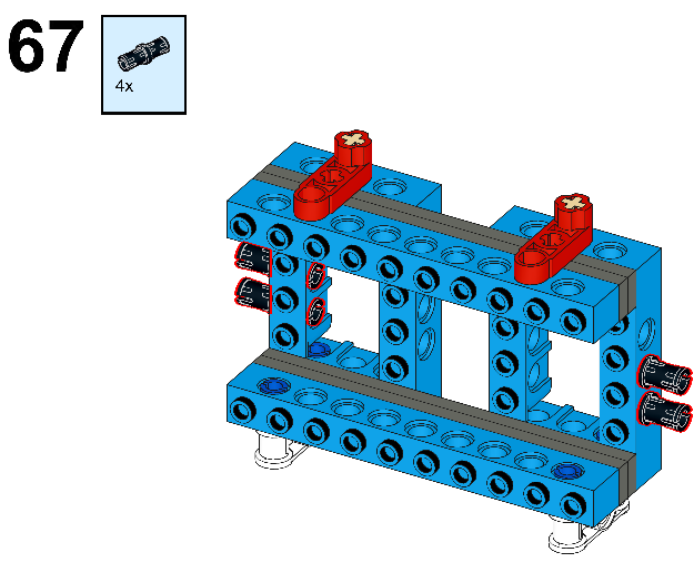


Figure 14.69

68. Take two 3x5 angular beams and connect them to the connector pegs, as shown in the following figure:

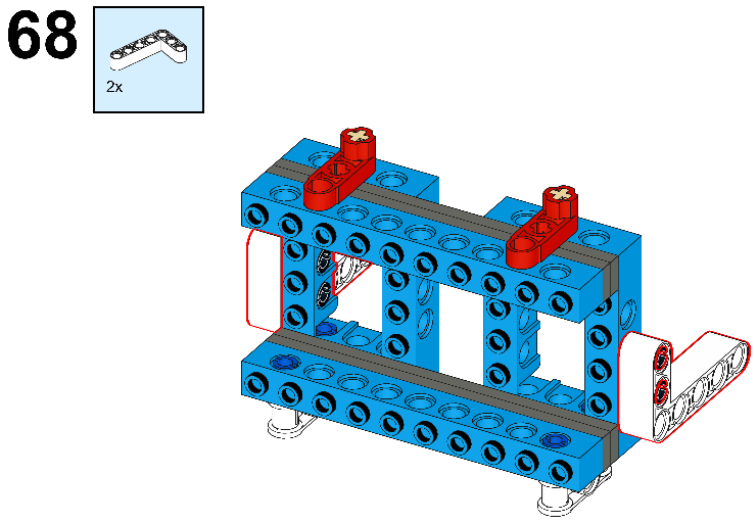


Figure 14.70

69. Take four connector pegs and connect them to both the angular beams (two to each beam):

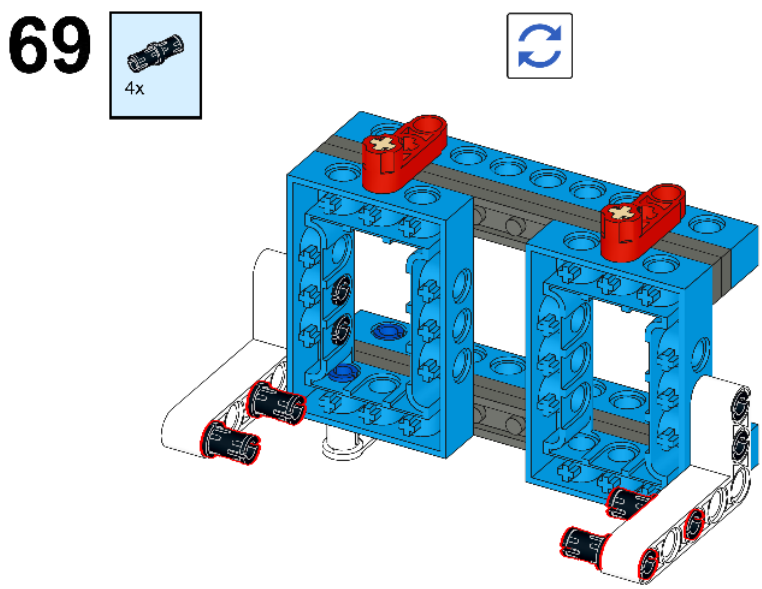


Figure 14.71

70. Take two 7M beams and connect them to the connector pegs, as in the following figure:

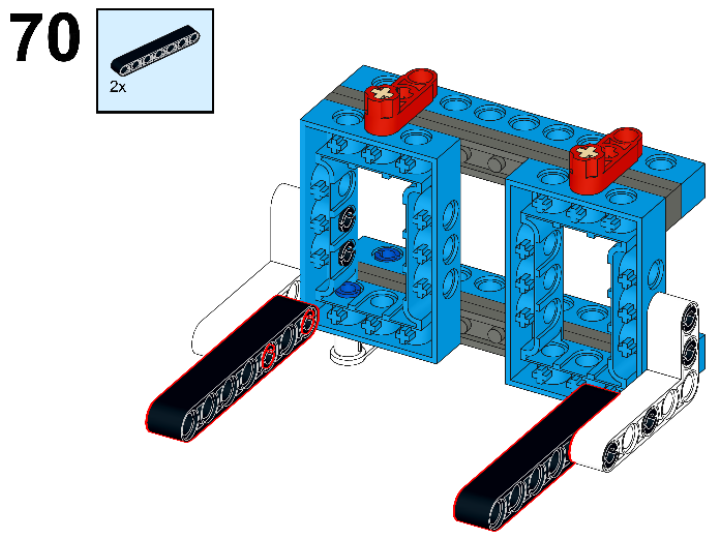


Figure 14.72

71. Take two 9M axles and pass them into the fourth and sixth holes of the 1x10 bricks, as shown here:

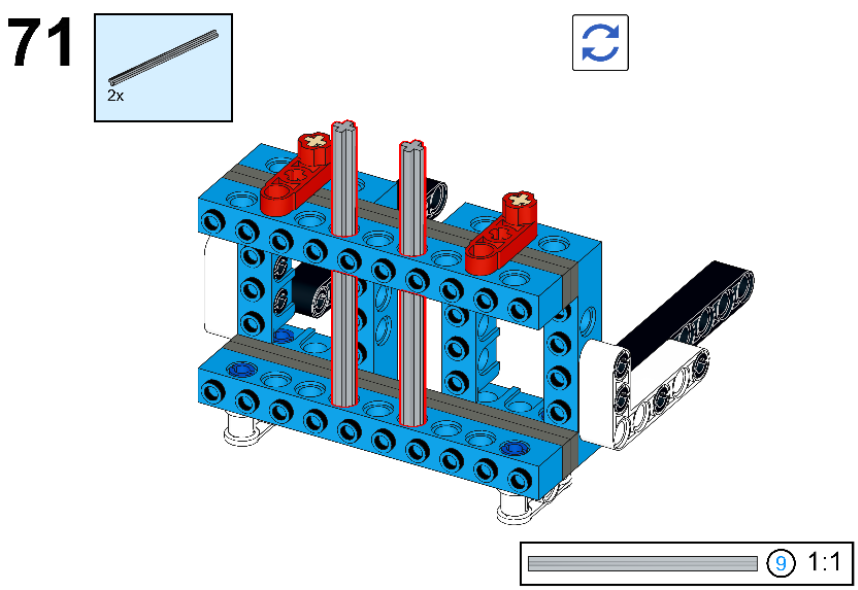


Figure 14.73

72. Now, take two bushes and connect them to the bottom of the 9M axles:

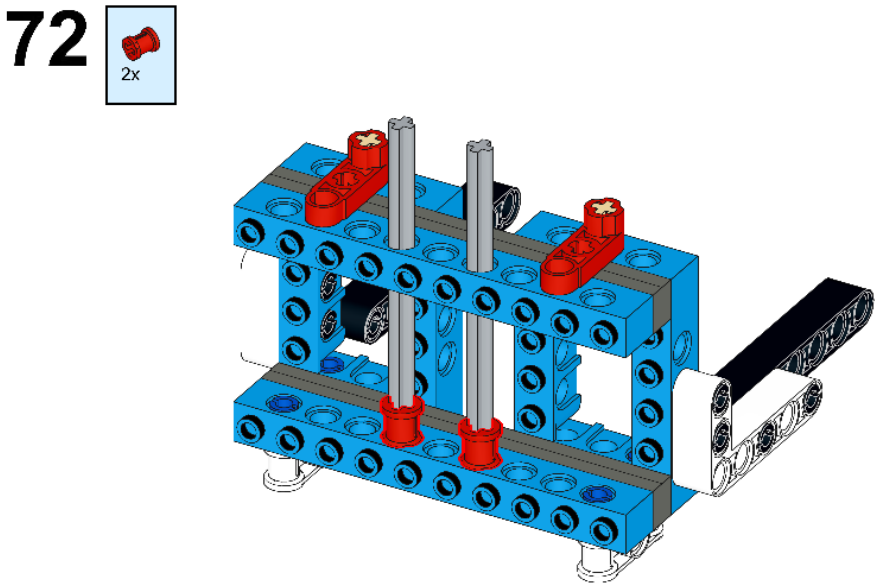


Figure 14.74

73. Take two 4x4 angular beams and connect them to both the 9M axles; place them before the bushes, as shown in the following figure:

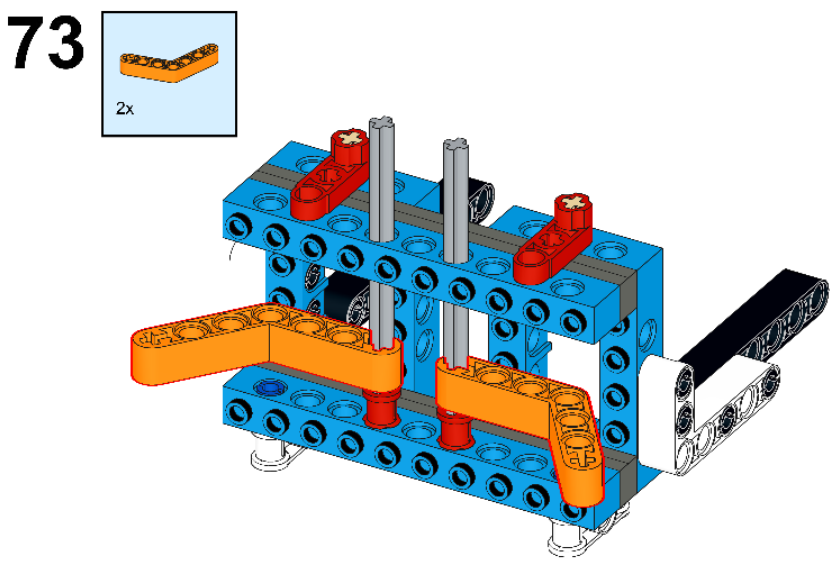


Figure 14.75

74. Now, take two tubes with double holes and connect them to the 9M axle; place them before the angular beams, as shown in the following figure:

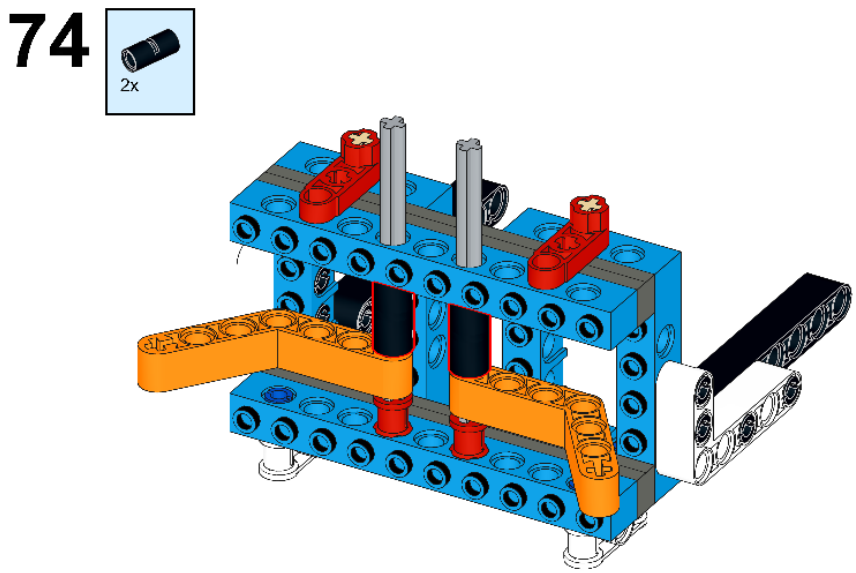


Figure 14.76

75. Now, take two bricks with crosses and connect them to the 9M axles, as shown in the following figure:

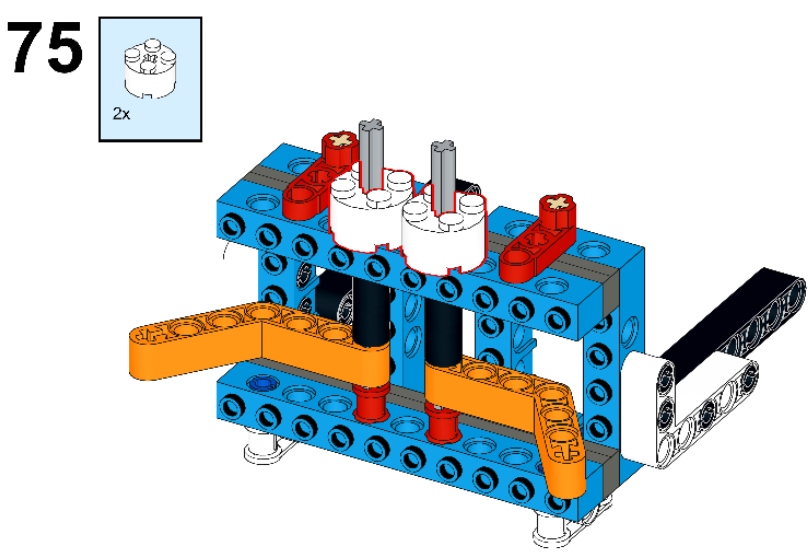


Figure 14.77

76. Take two 2x2x2 nose cones and connect them to the bricks with crosses:

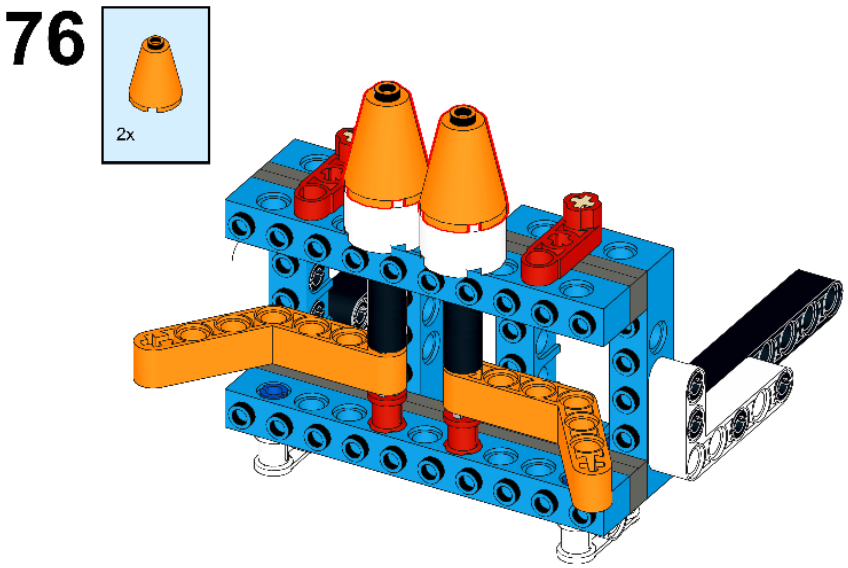


Figure 14.78

77. Now, take two connector pegs and connect them to both the angular beams, as in the following figure:

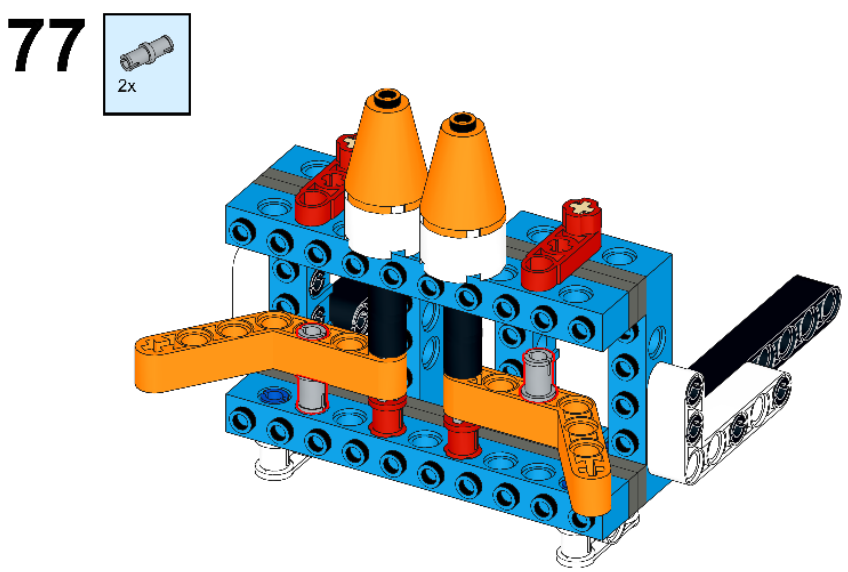


Figure 14.79

78. Take two 5M beams and connect them to both the connector pegs:

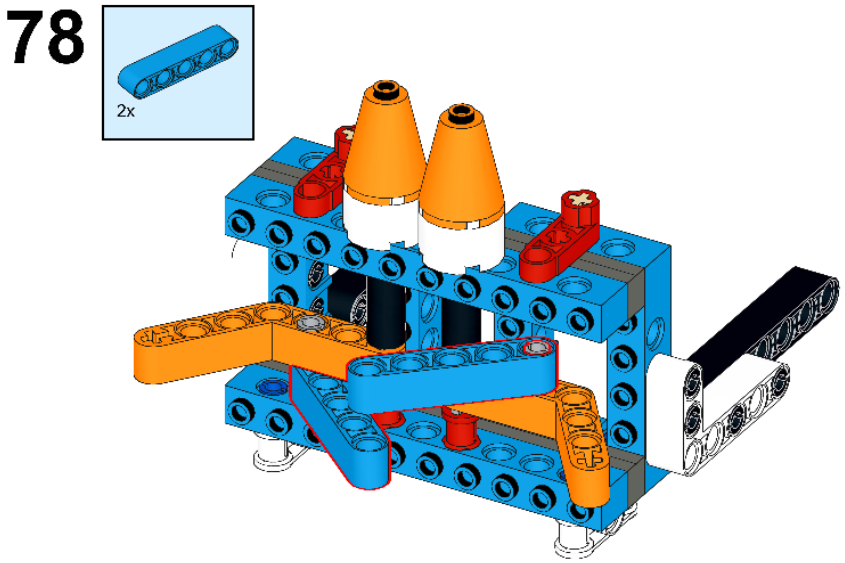


Figure 14.80

79. Now, take two 3M connector pegs and use them to connect both the 5M beams, as shown in the following figure:

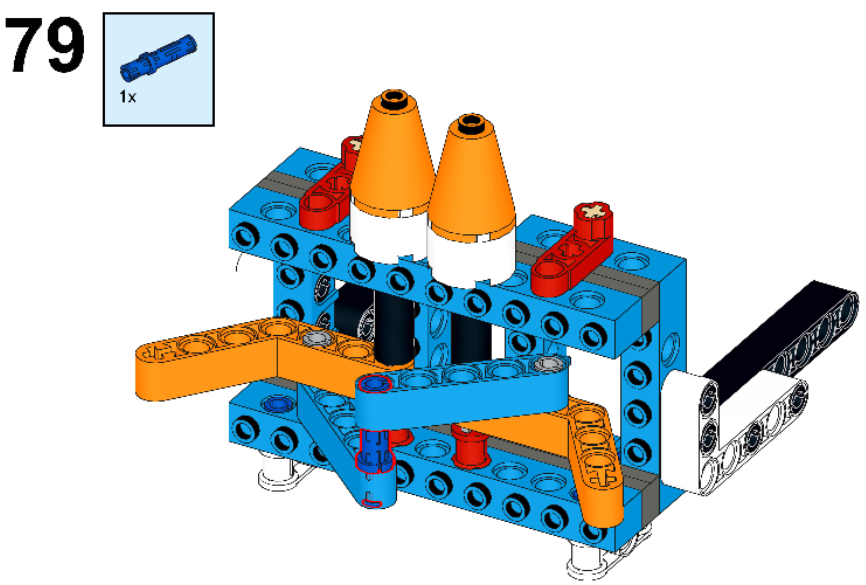


Figure 14.81

80. Take two 9M beams and connect the first hole of the beam to the 3M connector peg (here, you must place it between both 5M beams, and the rear part of the 9M beam will pass between the two 4x4 angular beams):

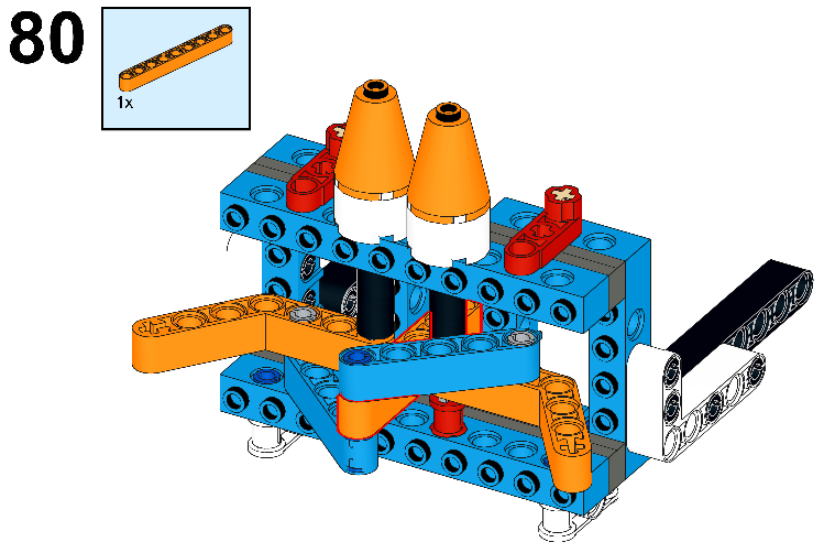


Figure 14.82

81. Take two 3M connector pegs and connect them to both the 4x4 angular beams, as shown in the following figure:

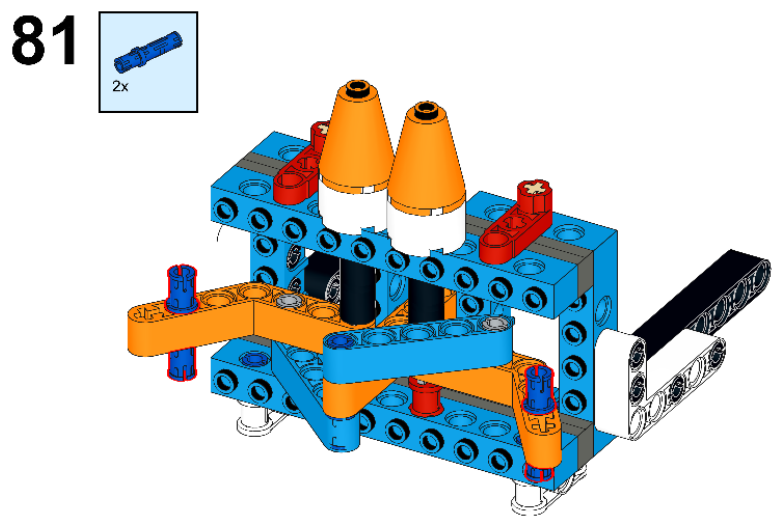


Figure 14.83

82. Now, take four 1x2 bricks with two holes, connect them to each 3M connector peg, as shown in the following figure:

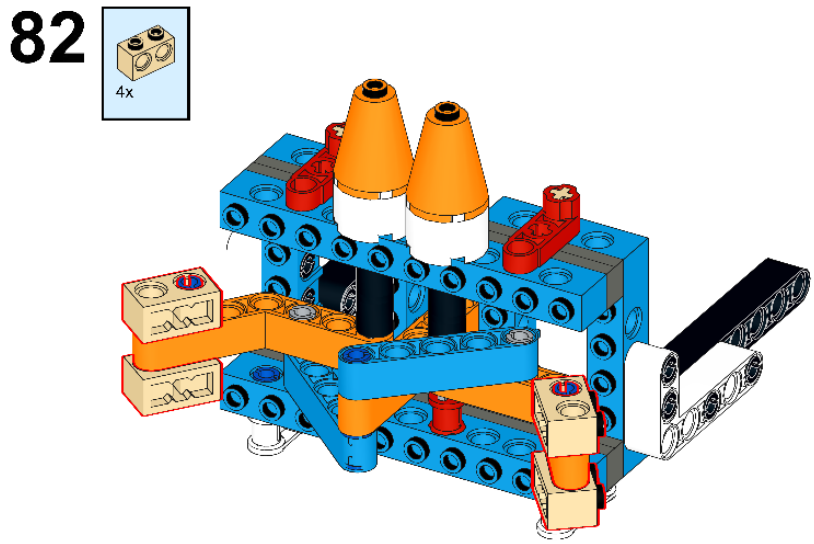


Figure 14.84

83. Now, take two 4M stopper axles and pass them through the 1x2 bricks as well as through the cross hole of the angular beam, as shown in the following figure:

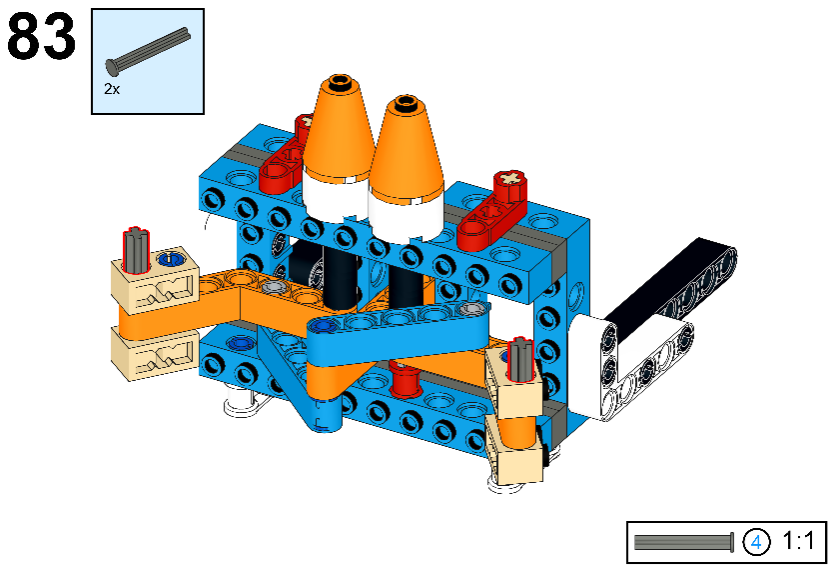


Figure 14.85

84. Take two bushes and connect them to the remaining part of both the stopper axles:

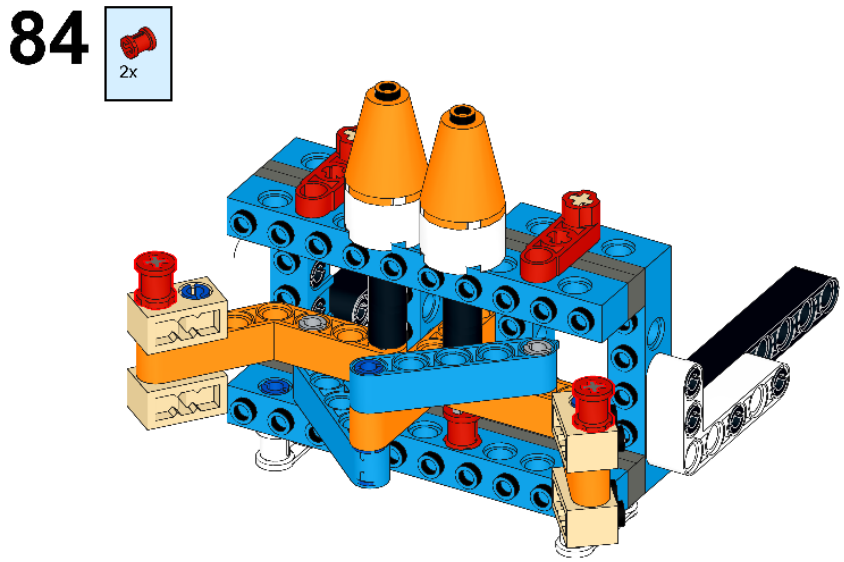


Figure 14.86

85. Now, take four 1x4 plates and connect them to all four 1x2 bricks, as shown in the following figure:

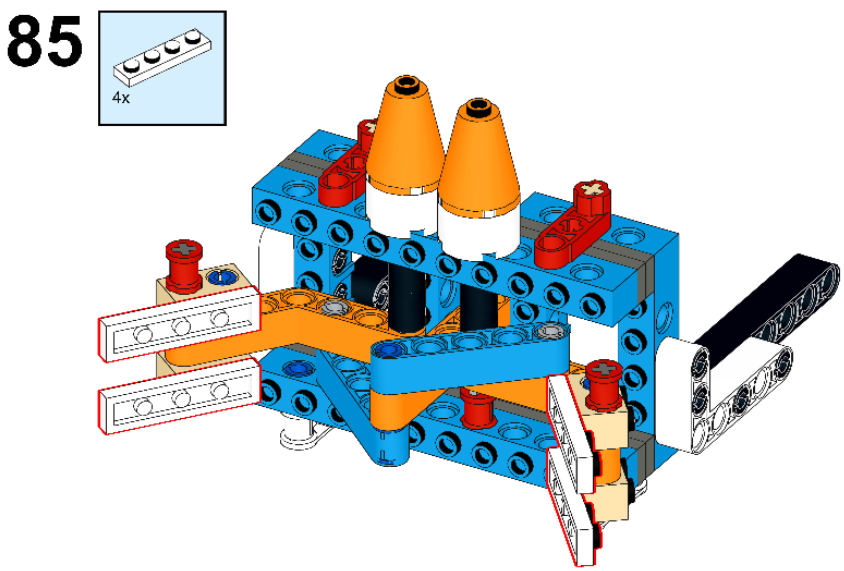


Figure 14.87

86. Take four 1x6 bricks with a bow and connect them to all four 1x4 plates:

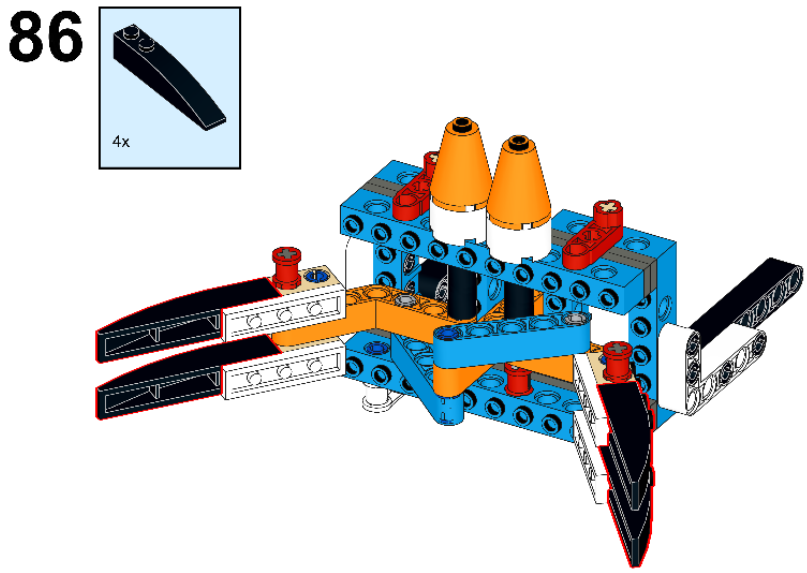


Figure 14.88

87. Then, take four rubber attachments and connect them to all four bricks with a bow, as shown in the following figure:

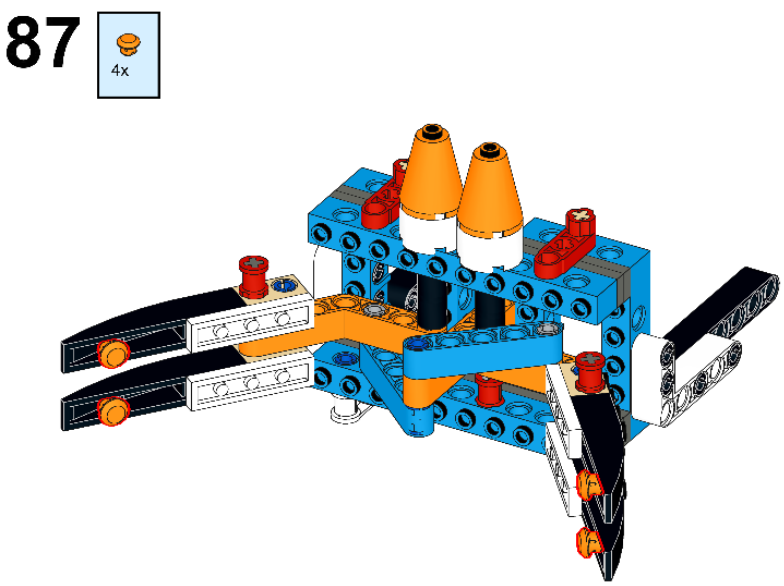


Figure 14.89

88. Now, take one 3x8 right plate with an angle and one 3x8 left plate with an angle, then connect them to their respective grabbing arms, as shown in the following figure:

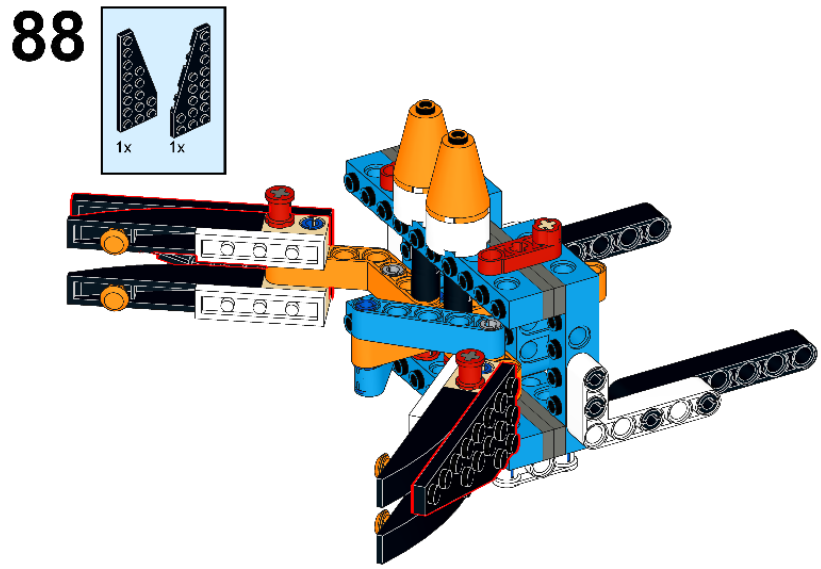


Figure 14.90

Great! The grabber is ready.

89. Check that your grabber looks like the one shown in the following figure:

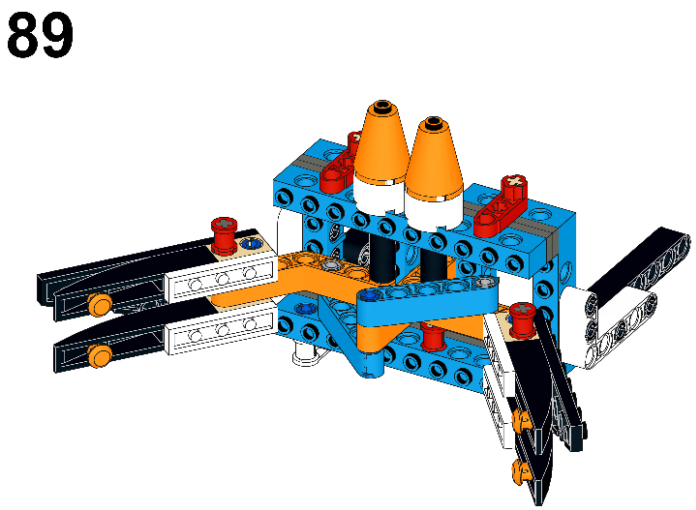


Figure 14.91

90. Now, let's connect this grabber to the robot. For that, connect the last hole of both the 7M beams to the axle that is passing from the 1x1 brick. (Here, remember that first, you have to pass this axle into the first 7M beam and then through the second:)

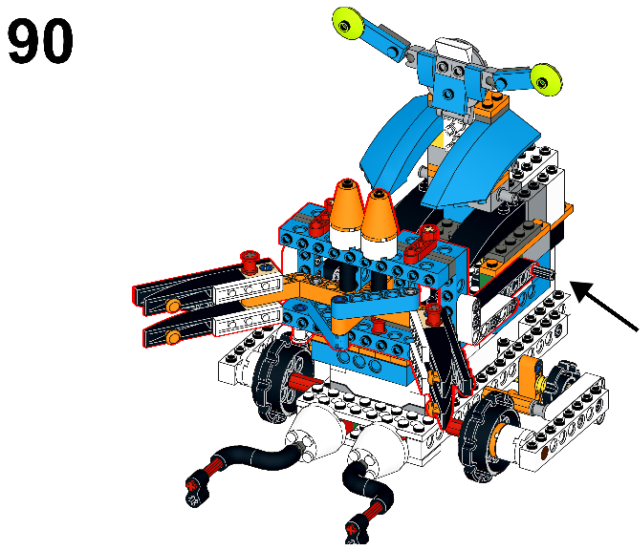


Figure 14.92

91. The arrow shows the point from where you have to connect.

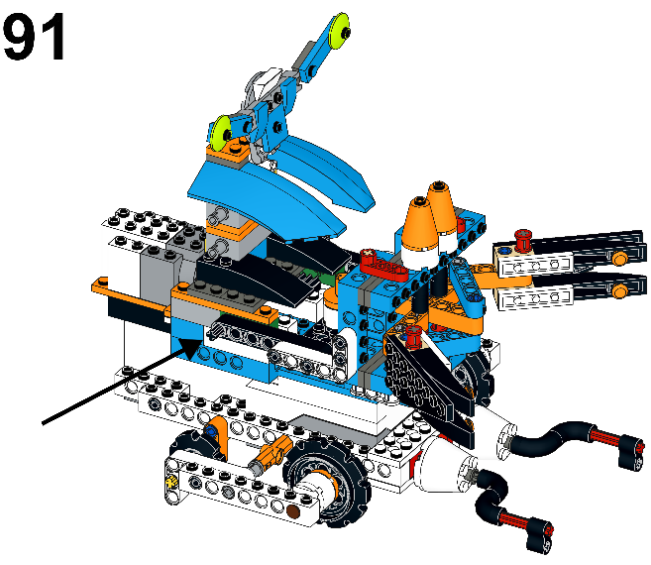


Figure 14.93

92. Now, take one 4M stopper axle and pass it from the 2x2 brick and the 2x2 round flat tile with a hole, marked by a red arrow in the following figure:

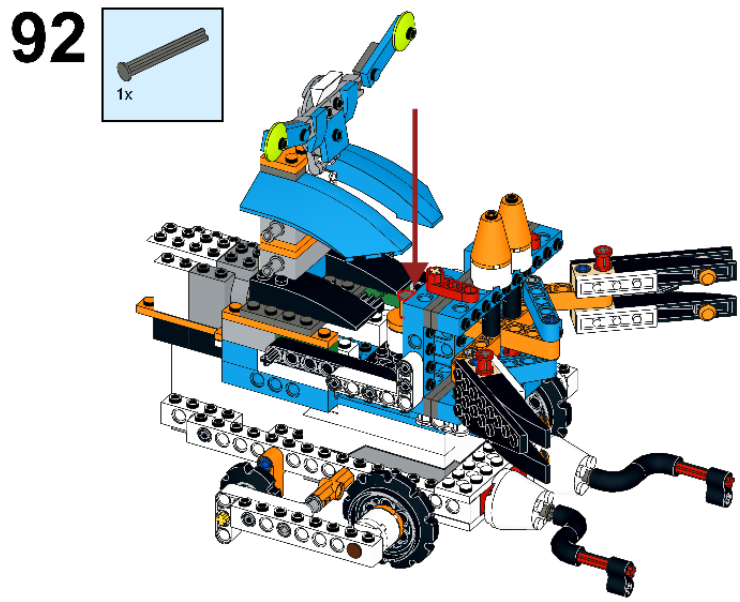


Figure 14.94

93. Now, let's make a round track to move the robot. For that, take two track elements and two rubber attachments, connect both the track elements to each other, then connect the rubber attachments to the track elements (one on each track element):

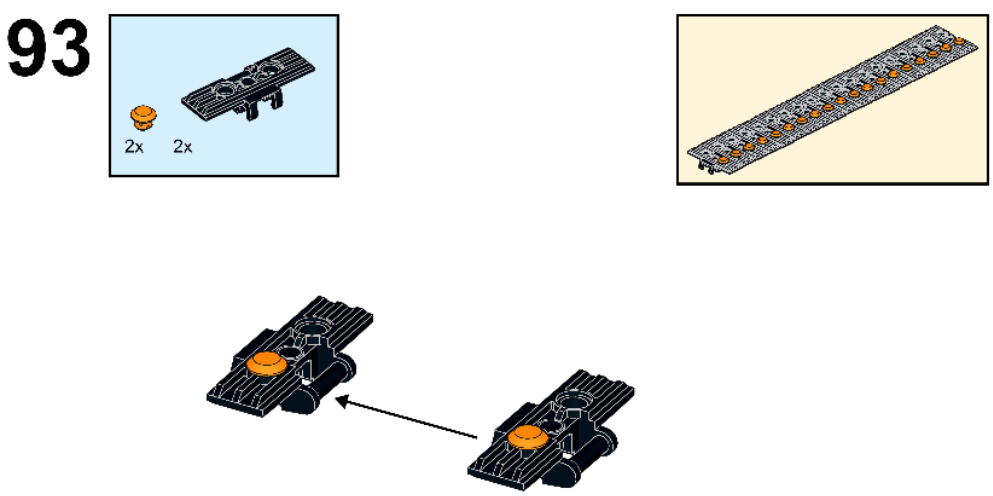


Figure 14.9

94. Now, take 17 track elements and 1x17 runner attachments, connect them, and make a track, as shown in the following figure. Make two tracks of the same length:

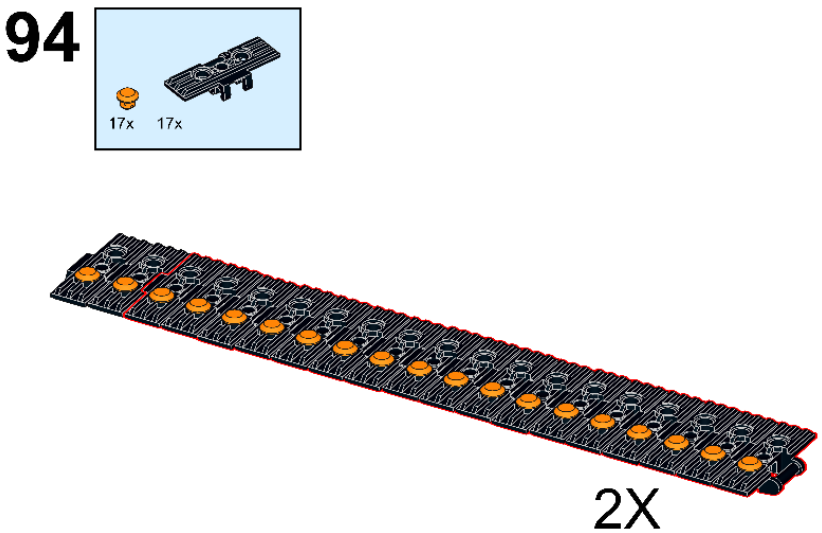


Figure 14.96

95. Now, take one of those tracks and fold it around both the sprockets on any one side, as shown in the following figure:

Figure 14.97

96. Now, flip the robot and take another track, and again fold it around both the sprockets of that side:

Figure 14.98

Good job!

Your grabbing robot is ready to grab the things you want:

Figure 14.99

97. Connect the external motor to port C.