

Homework – Levers, Shafts and Cranks

Levers, Shafts and Cranks were covered in Lecture and Lab. Refer to the file “**BricxCC – Strings, Motors and Touch Sensor**” and complete the following NXC programs. Observe “Best Practices” when writing your code.

1. Look up the `StrLen` function. Modify `strcat1_0a.nxc` to additionally display the number of characters in `firstName`, `lastName`, and `nickName`. Provide the NXC code, and a screen image (e.g. JPEG) demonstrating your code works (10-points)
2. Modify `helloMotor.nxc` by adding a do-while loop. This loop should repeat the `OnFwd(OUT_AC, 75)`, `Wait(5000)`, `OnRev(OUT_AC, 25)`; `Wait(2000)` cycle 3-times. Provide the NXC code, and a YouTube URL demonstrating your code works (10-points)
3. Look up the `RotateMotor` statement (page 308 Section 6.36.2.255). Set Motor A to run at a power level of 75 and rotate to -180 degrees. Provide the NXC code, and a YouTube URL demonstrating your code works (10-points)
4. In lab, you were constructed a Domabot. Construct a front “bumper” to mount a Touch Sensor. Create two walls (e.g. two stacks of books) and put your Domabot in the middle. Write an NXC program for the Domabot to move forward. When the bumper hits wall 1, the Domabot spins 180-degrees and moves forward again (towards wall 2). When the bumper hits wall 2, it again spins 180-degrees and moves forward again (back to wall 1). The Domabot stops when the user hits the Right Arrow button. Provide the NXC code, and a YouTube URL demonstrating your code works (30-points)
5. Studio Exercises: Pick any 2 Lift Mechanisms from #12, #13, #14, #16, #17 (see next page). Create the step-by-step Build Plan with Bill-of-Materials (BOM). Construct the mechanism and provide a URL for a YouTube video (max 20-seconds) demonstrating it working. (20-points)
6. Same as 4 above, but Pick any 2 Grabbing Things from #19, #20, #21, #22, #24 or #26 (20-points)

Lifting Things

#12

- Red Technic Pin x2
- Yellow Technic Pin x2
- Black Technic Pin x3
- Grey Technic Pin x3
- Blue Technic Pin x2
- Blue Technic Pin x4
- Yellow Technic Pin x2
- Yellow Technic Pin x2
- Red Technic Pin x4
- Yellow Technic Pin x2
- Red Technic Pin x4
- Grey Technic Pin
- Green Technic Pin

The diagram for step #12 shows the assembly of a red and yellow structure. It includes a list of parts: 2 red pins, 2 yellow pins, 3 black pins, 3 grey pins, 2 blue pins, 4 blue pins, 2 yellow pins, 2 yellow pins, 4 red pins, 2 yellow pins, 4 red pins, 1 grey pin, and 1 green pin. The assembly steps are shown in four images: 1. A red base with a yellow arm and a grey pin. 2. A red base with a yellow arm and a grey pin, with a blue pin being inserted. 3. A red base with a yellow arm and a grey pin, with a blue pin being inserted. 4. A red base with a yellow arm and a grey pin, with a blue pin being inserted.

#13

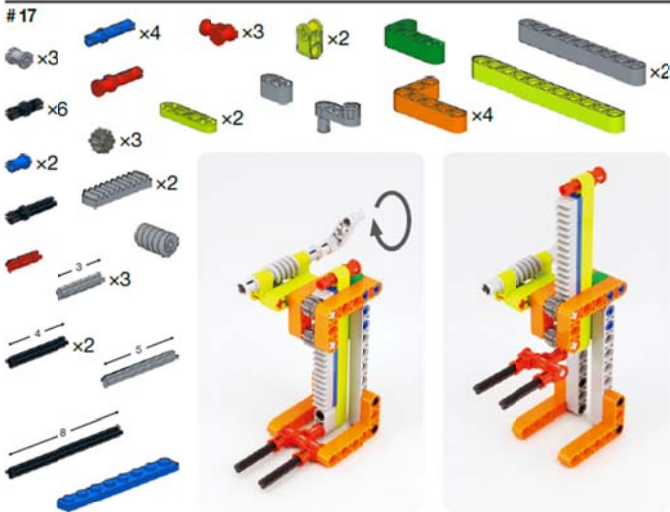
- Black Technic Pin x3
- Grey Technic Pin x2
- Yellow Technic Pin x2
- Black Technic Pin x2
- Black Technic Pin x2
- Black Technic Pin x2
- Red Technic Pin x2
- Green Technic Pin
- Yellow Technic Pin x2
- Yellow Technic Pin x2
- Yellow Technic Pin x2

The diagram for step #13 shows the assembly of a yellow and red structure. It includes a list of parts: 3 black pins, 2 grey pins, 2 yellow pins, 2 black pins, 2 black pins, 2 black pins, 2 red pins, 1 green pin, 2 yellow pins, 2 yellow pins, and 2 yellow pins. The assembly steps are shown in four images: 1. A yellow base with a red arm and a black pin. 2. A yellow base with a red arm and a black pin, with a red pin being inserted. 3. A yellow base with a red arm and a black pin, with a red pin being inserted. 4. A yellow base with a red arm and a black pin, with a red pin being inserted.

A spare piece

The diagram for step #13 shows the assembly of a yellow and red structure. It includes a list of parts: 3 black pins, 2 grey pins, 2 yellow pins, 2 black pins, 2 black pins, 2 black pins, 2 red pins, 1 green pin, 2 yellow pins, 2 yellow pins, and 2 yellow pins. The assembly steps are shown in four images: 1. A yellow base with a red arm and a black pin. 2. A yellow base with a red arm and a black pin, with a red pin being inserted. 3. A yellow base with a red arm and a black pin, with a red pin being inserted. 4. A yellow base with a red arm and a black pin, with a red pin being inserted.





Gripping Things

#19

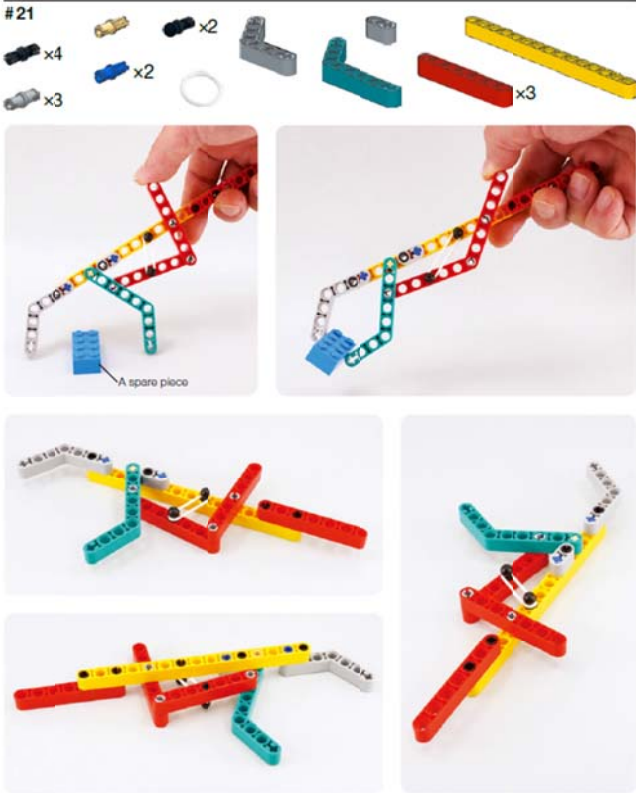
x6 x2 x2 x2 x2 x2

A spare piece

#20

x4 x10 x2 x2 x2 x2 x2

A spare piece



- #24
- Black pin x2
 - Grey axle x8
 - Grey axle (length 3) x4
 - Black Technic beam (length 4) x4
 - Orange Technic pin x2
 - Light green Technic beam (length 2) x2
 - Yellow Technic pin x6
 - Blue Technic pin x2
 - Red Technic pin x4
 - Red Technic pin (with hole) x2
 - Light tan Technic beam (length 4) x2
 - Grey axle (length 4) x2
 - Red L-shaped Technic pin x2
 - Yellow Technic beam (length 6) x6
 - Light tan Technic beam (length 6) x2



