

## Humanoid Interactive Robot

### Production Plan

Written by the Industrial Engineers: Ahmed Alsuhaibani & Noha Shafiq

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| Step 0: Designing the mechanical parts   |  |
| Designing Software                       | Solid works, Cinema 4D.  |
| Step 1: Producing the head of the robot  |  |
| Manufacturing Machine                    | 3D printing, because we want an accurate place for the smart screen of the robot which will need some ports for the electric parts.  |
| Material                                 | Plastic. It may be more convenient due to its poor electric conductivity, ease of shaping and its light weight.  |
| Production Method                        | <p>It may be separated for 3 parts (Back , Middle , Front):</p> <ol style="list-style-type: none"><li>1- The back of the head will contain the electrical parts and cables which will be designed as a cubic shape. Its dimensions should be at most (25cm height*15cm depth*20cm width.</li><li>2- The middle part is the smart screen's holder, with specified dimensions for the screen.</li><li>3- The front part is the frame of the smart screen to prevent the fall of the screen and will be attached to the middle part.</li></ol>  |
| Step 2 : Producing the Arms of the robot |  |
| Manufacturing Machine                    | 3D printing, because the arms have limited length compared to the other parts and we can determine the place of the EE parts.  |
| Material                                 | Aluminum, low weight, fair price, good strength, and its attractive shape  |
| Production Method                        | <p>Each arm should be separated for 3 parts in manufacturing,</p> <ol style="list-style-type: none"><li>1- First part will be the upper arm which have (25cm length*8cm width* 8cm depth). with curved edges to make it more attractive. Having an end with a specific design for the hinge to link the upper and the lower arm together.</li><li>2- Second part will be the lower arm which will have at the top with a specific design for the hinge to link it with the upper arm. Its dimensions will be (20cm*8cm*8cm) with a prepared end for the designed hinge of the hand.</li><li>3- Third part is the hand which will be linked with the lower arm with prepared design at the top for the hinge. The hand will be designed with 5 adjoined fingers to represent the real human's hand.</li></ol> |

| Step 3: Producing the Body of the robot                               |  |
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| Manufacturing Machine   | <p>CNC machines and 3D printers.</p> <ul style="list-style-type: none"> <li>- The CNC will be used to produce the aluminum sheets for the front and the back of the robot with specific shapes and with dimensions less than (60cm height and 60cm width).</li> <li>- 3D printers will be used to produce the 2 sides of the robot's body with the desired shapes.</li> </ul>  |
| Material  | Aluminum & Plastic   |
| Production Method   | <ol style="list-style-type: none"> <li>1- The CNC machinist will enter the specified design for the front and the back of the robot. The Aluminum sheets will be place inside the CNC machine. Finally the "Laser beam" of the CNC will cut the sheets into the entered design.</li> <li>2- The 3D printers will take the (.stl file ) for the 2 sides and it will produce the desired pieces of plastic.</li> </ol> |
| Step 4: Producing the Legs of the robot                               |  |
| Manufacturing Machine   | <p>3D printers. It will be a good way to produce 2 legs with a base to connect them together.</p> <ul style="list-style-type: none"> <li>- The leg height should be at most 30cm, 10cm width for one leg.</li> <li>- 10cm height, 40cm width and 30cm depth for the base to link the 2 legs.</li> </ul>  |
| Material  | Plastic  |
| Production Method   | <ol style="list-style-type: none"> <li>1- For the legs, the designed shape will be entered into the 3d printer as .stl file to produce the 2 legs with specified dimensions.</li> <li>2- Then the base will be produced separately.</li> <li>3- The legs and the base will be connected together using screws,</li> <li>4- 4 wheels will be added under the base.</li> </ol>   |
| Step 5: Installing electrical parts                                   |  |
| Step 6: Manual assembly   |  |
| Step 7: Linking the produced robot with the designed internet program |  |

**#NOTE: All these steps and parts dimensions are based on our initial approximations.**