# MoveMoveHystory

During 2019 together with Francesco I tried several approaches to use Arduino with motor carrier and some preliminary result has been obtained with a Lego building but with no real working object.

The most relevant obstacle has been the infrared topic, were I went through so much upsetting incomplete documentation I can’t really tell you.

During last Arduino evening with Francesco before Covid lockdown in January 2020, Francesco took home some materials with the aim of testing infrared remote control and try to make some steps further.

Anyway this is the past and now, end of May 2020 that seems Covid is steadly evolving into a most unde control situation, it’s time to start again this project aimed at building a robot that

* Can move
* Can be driven by infrared transmitter and receiver
* Can sense a distance and react accordingly

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|  | As in every human activity, define a compelling dealine to really end the project. Right now we don’t’ have anyone but for sure we can find it out something |

## Logical components

The most fascinating part of the story is the fact that is split into different adventures. What is a real adventure? Is an activity that has a goal but that is not clear in terms of path and uncertain with referral to the events that alongside the journey can occur.

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| Brick1 | Wooden structure physical object |
| Brick2 | Arduino circuit and motorcarrier |
| Brick3 | Infrared transmitter and receiver |
| Brick4 | Power Supply |
| Brick5 | Putting Everything Together |
| Brick6 | Coding |
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### Brick1 – Woodden structure, physical object

|  | **Activities done** | **Decision and choices** | **Lessons learnt** | |
| --- | --- | --- | --- | --- |
| Idea, Project, Design | Draft the physical model on cartoon | Size 17 cm diameter  Holes  Holes position |  | |
|  | Define functional requirements and related technical requirements |  |  | |
|  | Design the motor wheels mounting | Where to mount 2 motor wheels. Whether above or below the the first wooden floor.  Final decision “below” even tough Robot Bonanza suggests the opposite | In order to mount 2 motor wheels and a third front wheel, the position of first two yellow motor wheels can be slightly shifted backward | |
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|  | Define **what** and **how** to test | What deserves being prototyped before final built | | Understand if it is possible to have a complete final artifacts for testing purposes or if it is not worth and the final integration test will happen on the real final artifact |
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Since the realization is a more practical task, activities and pictures are the documentation focus, while decisions (D) and lessons learnt (L) are noted

|  | Activities done |  | Decision, choices and lessons learnt |
| --- | --- | --- | --- |
| Realization | Realize the wooden chassis  Source the wood |  |  |
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#### Items list

| Item | Description | Price |
| --- | --- | --- |
| Wood sheets | Scraps from Bricocenter 30 \* 30 cm irregular tables  L ?\*W?\*H between 6 mm and 8 mm |  |
| Viti | M3 \*10mm o 12 mm con dado esagonale |  |
| Distanziatori esagonali  Standoff  Distanziali  PCB spacer | M3 bronzo uniti7 o 8 avvitati uno sull’altro |  |
| Wheels | KKmoon Set di 2 Motoriduttori DC + Ruota per Arduino DC 3V-6V Smart Car DIY Project  <https://www.amazon.it/gp/product/B07B4875JJ/ref=ppx_yo_dt_b_asin_image_o00_s00?ie=UTF8&psc=1> | 11,98 € |
| Squadrette di fissaggio |  |  |
| Viti sottili di fissaggio wheels a squadrette |  |  |

## Brick 2 - Arduino circuit and motorcarrier

|  | **Activities done** | **Decision and choices** | **Lessons learnt** | |
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| Idea, Project, Design | Selection of motorcarrier | Different, even tough not infintite options are available.  In parallel 2 different motor carrier have been sourced and tested   1. Adafruit Motor Shield V1 | It’s substantially not feasible not to use a motorcarrier | |
|  | Addition of a shield to access pins | Gikfun Screw Shield identified | Needed to utilize **free pins after** having mounted Adafruit Motor Shield on top of Arduino Uno  In this case first need was to mount and operate IR receiver to drive the robot | |
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|  | Activities done |  | Decision, choices and lessons learnt |
| --- | --- | --- | --- |
| Realization | Connection of  Motor carrier 3 and 4 to M4\_A , M4\_B, M3\_A and M3\_B |  | Red cable to \_A and black cable to \_B  By doing this way both motors behave the same way |
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#### Items list

| Item | Description | Price |
| --- | --- | --- |
| Adafruit Motor shield V1 | <https://learn.adafruit.com/adafruit-motor-shield/overview>  <https://www.amazon.it/Lysignal-Expansion-Arduinos-Diecimila-Duemilanove/dp/B073GRYT5R/ref=sr_1_8?__mk_it_IT=%C3%85M%C3%85%C5%BD%C3%95%C3%91&dchild=1&keywords=arduino+motor+shield&qid=1592457731&sr=8-8>  there is also V2 version available: <https://learn.adafruit.com/adafruit-motor-shield-v2-for-arduino> | 8,99 € |
| Gikfun Screw Shield Expansion Board Arduino UNO R3 EK7007 | <https://www.amazon.it/Gikfun-Shield-Expansion-Arduino-EK7007/dp/B014SGTP20>  acquistato 31 maggio 2019 | 17,30 € |
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## Vertical know how

Alongside the adventure several tools, instruments, software programs are used. This session is aimed at specifying the tools, some procedural tricks if needed and the reference to other documentation.

Details and specifications about the materials and the items used are collected and explained into the above section.

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| SwissKnife1 | | Fusion360 and InkScape |
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### SwissKnife1 – Fusion360 and InkScape

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|  | Goal |
| Why | Fusion360 is used to printout the model (the dima) of the wooden structure with the holes properly positioned.  The printout manually drafted on the wood sheet is then cut with and hand saw  In the future the same sketch will be hopefully used with a laser cutter.  Since Fusion360 incredibly doesn’t allow direct print, an export and import to Inkscape is the workaround I found to make it. |

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|  | Step | Image | Description |
| How | Draft the sketch |  | Within Fusion 360 the sketch mode has to be selected |
|  | Crete circle and line |  |  |
|  | Use Sketch Dimensions |  | Purpose is to position holes accordingly to the need. In this case reference from book “Arduino Robot Bonanza” is used and adapted  A dummy line is added to establish a measure from the circumference (as a tangent) to the drilled hole center |
|  | File 🡪Export |  | Export as .DXF is the option used to upload into Inkscape and finally print |
|  | Within Inkscape  File🡪Import |  | Import the .DXF file.  In this case a **10 X scale**, identified by chance, was fundamental to maintain the 1:1 scale with the original Fusion360 drawing  Select 🡪 Manual scale  Enter 🡪 10 Manual scale factor  Then reposition properly on the sheet and finally printout |
|  | Additional trick    Within Fusion360 when you reopen a sketch, the sketch mode isn’t active by default. In order to keep on sketching you have to activate again the mode, which isn’t neither obvious nor simple |  | Select top view  Then  RightMouseButton on FirstFloor 🡪Edit Sketch out of drop down menu |
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|  | Link | Notes |
| References | Lezione 03 schizzi bidimensionali  <https://www.youtube.com/watch?v=LQJyzXo6fMw>  Lezione 04 Quote e vincoli  <https://www.youtube.com/watch?v=a-iNwxi8KP0> | Sketching tool. At least 4 / 6 hours to learn the basics. Some videos can make the difference. |