Bubblebox escape games

Get all the best moments in pop culture and entertainment delivered to your inbox. The main goal of this project was to build a robot that would distinguish itself from existing robots, and which can be used in a real and innovative field. Based on personal experience, it was decided to build a robot in the shape of a car to be implemented in Escape Game. Thanks to various components, players could turn on the car, solving the riddle on the controller, controlling the car's trajectory, and getting the key on the way to escape the room. Since this project was part of the course of mechatronics, given in Université Libre de Bruxelles (U.L.B.) and Vrije Universiteit Brussel (V.U.B.), Belgium, several requirements were presented at the beginning, such as: Using and combining fields of mechanics, electronics and programming Budget 200 € Having a ready and working robot that brings something newl how it will be used in real life avoid game sessions , sometimes several sessions in a row, it was necessary to fulfill several more requirements :Autonomy: finding a way to make the robot semi-autonomous to respect the gaming limitations User-friendly: ease of use, the presence of a screen with feedback on the reliability of the camera: strong materials capable of absorbing strikes Safety: players are not in direct contact with robotsA explained in the introduction , the main concept of this project is to create and build a semi-autonomous robot , first player-controlled escape game, then able to play control from players. The principle is this: Imagine being locked in a room with a group of friends. The only way to leave the room is to find the key. The key is hidden in the maze, located underfoot, in a dark intermediate floor. To get this key, you have three things at your disposal: a remote control, a map and a screen. The remote control allows you to drive in the intermediate floor, solving the mystery imagined on the existing control buttons of the remote control. Once you've solved this riddle, the car is turned on (cfr. Step 5: Coding is the main feature called 'loop()') and you can start steering the car through the maze using this map. The screen is there to display live what the car sees, thanks to the camera fixed in front of the robot and therefore help you see the trajectories and, more importantly, the key. Once you have received the key thanks to the magnet at the bottom of the robot, and once you have reached the end of the maze, you are able to take the key and escape from the room you have been locked in by the main components of the robot, hence: The riddle that will be solved on the remote control of the robot by players with a remote control display based on the video shot live by the cameraThis game is the main limitation is the time (in most evacuation games you have from 30 minutes to 1 hour to succeed), attached and connected at the base of the robot, so if you, as players, exceed the set time (in our case 30 minutes), the robot takes control back and finishes the parkours by itself, so you have a chance to get the key from the room before the game timer goes (in our case 1 hour)Also, since the car is in a completely dark room, the LEDs are fixed not far from the sensor to help it read the signal from the ground. The desire of this group project to base itself on what already exists in the marketplace, change it, adding personal value, and be able to use it in some fun and interactive field. In fact, after contact with the successful Escape Room in Brussels, Belgium, we found that escape games are not only more and more famous, but that they often lack interactivity and that customers complain not to be part of the game enough. So we tried to come up with the idea of a robot that would meet the specified requirements by inviting players to really be part of the game. Here's a summary of what's going on in the work :- Not the standalone part: the remote is connected to Arduino through the receiver. Players control the remote control and therefore control arduino, which controls the engines. Arduino is included before the game starts, but it enters the main function when players solve a riddle on the remote control. IW wireless camera is already on (enabled simultaneously with the whole (operated by Arduino) when enabled / disabled). Players guide the machine using the remote control: they control speed and direction (cfr. Step 5: flowchart). When the timer that starts when you enter the main function is 30 minutes, the control from the controller is 30 minutes away.- Offline part: the control is controlled by Arduino. After 30 minutes, the line's IPR tracker starts monitoring the line on the ground to finish parkours. MATERIALElectronic partsMicrocontroller : Arduino UNO Arduino Motor Shield - Reichelt - 22.52 € Sensors : ICH Linear Tracker - Mc Hobby - 16.54 € Batteries : Other : Protoboard Wireless camera (receiver) - Banggood - 21.63€ Remote control (transmitter + receiver) - Amazon - 36.99 € Charging dock (receiver qi) - Reichelt - 22.33 € (not used - cf Step 7: Conclusion)Led - Amazon - 23.60 € Mechanical Chassis Set PartDIY - Amazon - 14.99 € Used: 1x Switch 1x Wheel 2x Wheel 2x DC Engine 1x Battery Holder Not used: 1x car chassis 4x M3*30 screw 4x L12 scattering 4x mounting 8x M3*6 propeller M3 nutMagnet - Amazon - 9.99€ Bolts, nuts, screws M2*20 M3*12 M4*40 M12*30 all matching nuts3D printed pieces: 5x spring 2x motor fixation 1x L-shaped line fixingLazer cut pieces: 2x round flat plates 5x rectangle small flat plateTOOLMachines : Hand drill drill drillers hand drillers used both laser cutting and 3D printing techniques to produce some of our components. You can find all CAD files Below. Laser Cutter The two main fixation pieces of the robot were laser cutting :(Material = MDF cardboard 4mm) - 2 round flat discs, to make the base (or chassis) work - Multiple holes in two discs to accommodate mechanical and electronic components - 5 rectangular small plates to fix springs between two chassis plates3D printer (Ultimakers & Prusa)Various elements of the robot were printed 3D , in order to give them stability and flexibility simultaneously :(Material = PLA)- 5 springs : Note that springs are printed as blocks, so you need to submit them to give them their spring shapes !- 2 rectangular empty parts to fix the engines-L-shaped piece to accommodate the trackerMechatronics_RoboMaze.stepAs line you can see on the electronic sketches, Arduino, as expected, the central piece of the electronic part. Connexion Arduino - Linear tracker :(cfr. corresponding follower of the sketch)Connexion Arduino - Motors :(cfr. corresponding general sketch - left)Connexion Arduino - Remote control receiver :(cfr. corresponding general sketch - up)Connexion Arduino - LEDs :(cfr. corresponding general sketch - left)Protoboard is used to increase the number of ports 5V and GND and facilitate all connections. This step is not the easiest, because it must comply with the requirements allocated above (autonomy, convenience, reliability, safety), and as an electric circuit requires special attention and precaution. Part of the encoding applies to Arduino, engines, remote control, linear tracker and LEDs.You can find the code:1. Declaration of variables :D statement of the pin used by the RC receiver pin declaration used by the DC Motors PIN declaration used by the LEDs Declaration of Variables used by the Riddle function of the Declaration pin code used by the IH Sensors of the Declaration of Variables used by IPR Deck2. Initialization function: Initialize different pins and LEDs and LEDs3. Engine function : Function 'turn_left()' Function 'turn_right()' Function 'CaliRobot()'4. Functional line tracker: Uses the previous CaliRobot() function during semi-autonomous robot behavior.5 Remote control (riddle) function: Contains the right solution for the riddle presented to players.6 The main function of the cycle: allows players to drive after they have found a solution to the conundrum, launches the timer, and switches the input from digital (remotely controlled) to digital (autonomous) as soon as the timer goes above 30 minutes the main code process is explained in the flowchart here above, with the main functions highlighted. You can also find all the code for this project in the .ino attached file that was written using the Arduino IDE development interface. MechatroFinalBernardo.inoOnce we have all the components of laser cutting, 3D printed, and ready : we can collect it all! First 3D printed springs on their laser cut rectangles with bolt diameter equal to the diameter of the holes inside 5 springs are fixed to their small plates, we can fix the last chassis on the bottom plate with smaller bolts. Second, we can fix the engines on 3D-printed motor fixations, under the lower chassis plate with small bolts. Once they are fixed, we can go in to fix 2 wheels on the engines inside the holes of the lower chassis plate. Third, we can secure the castor wheel, also under the lower chassis plate, with small bolts in such a way that the lower chassis plate is horizontalThis can now fix all the other componentsSalizer chassis: Over : Remote receiver controller Arduino & Motor shield LEDUpper chassis plate: Below : Over: Finally, we can assemble two chassis plates together. Note: Be careful when folding all the components together! In our case, one of the small spring plates was damaged when folding two chassis plates because it was too thin. We started again with more width. Be sure to use durable materials when using laser cutting (as well as a 3D printer) and check the dimensions so your pieces are not too thin or too fragile. Once all the components are assembled (make sure all components are well snapped and not at risk of falling), the camera receiver connected to the screen (i.e. the TV screen) and the batteries (6x 1.5V) are put on the battery holder, you're ready to check it all! We tried to take the project one step further by replacing the batteries (6x 1.5V) with a portable battery, by: building a charger dock (a wireless charger fixed to a laser cutting charging station (see photo)) ; adding a receiver (qi receiver) to a portable battery (see photo) ; Writing a feature on Arduino asks the robot to follow the line on the ground in the opposite direction to reach the charging doc and charge the battery so that the entire robot is autonomously ready for the next game session. Because we encountered problems replacing batteries with a handheld battery right before the project deadline (reminder : this project was monitored by our U.L.B./V.U.B. professors, so we had a deadline for respect), we were unable to test the completed robot. However, you can find here a video robot powered by a computer (USB connexion) and operated by a remote control. However, we were able to achieve all the added values we focused on: - Reliability - Round Shape - Rotary Riddle- Control Switch (Remote Control -> Standalone)If this project has kept your attention and your curiosity, we are therefore very interested to see what you have done, seeing if you have taken some steps other than us and seeing if you have managed in the offline charging process! Feel free to tell us what you think of this project! !