COST REPORT

Robotivia Hackathon 1.0 Competition

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Executive Summary

In this report, we present our cost management strategy for building the robot while maintaining efficiency and optimizing the budget. We employed innovative cost-saving measures to ensure maximum performance at minimal cost. Our approach included selecting cost-effective components, reusing available materials where possible, and strategically sourcing parts from the most economical suppliers.

The total budget utilized for the robot was EGP 3576, which remains well within the competition's budget constraints. The following sections detail the innovative cost-saving methods and a comprehensive breakdown of the materials used.

Innovative Cost-Saving Measures

1. **Optimal Motor Selection: Instead of using high-power and expensive motors, we opted for cost-effective DC motors that deliver sufficient performance while conserving power.**
2. **Efficient Microcontroller Usage: To accommodate the required number of I/O pins, we replaced the need for an expensive Arduino Mega with two Arduino Uno boards, significantly reducing costs.**
3. **Servo Motor Optimization: For the ARM mechanism, we used budget-friendly servo motors that were powerful enough for our needs, avoiding unnecessary expenses on high-torque models.**
4. **For the arm, we 3D printed the structure and assembled it with servo motors, reducing costs compared to purchasing a pre-made arm.**

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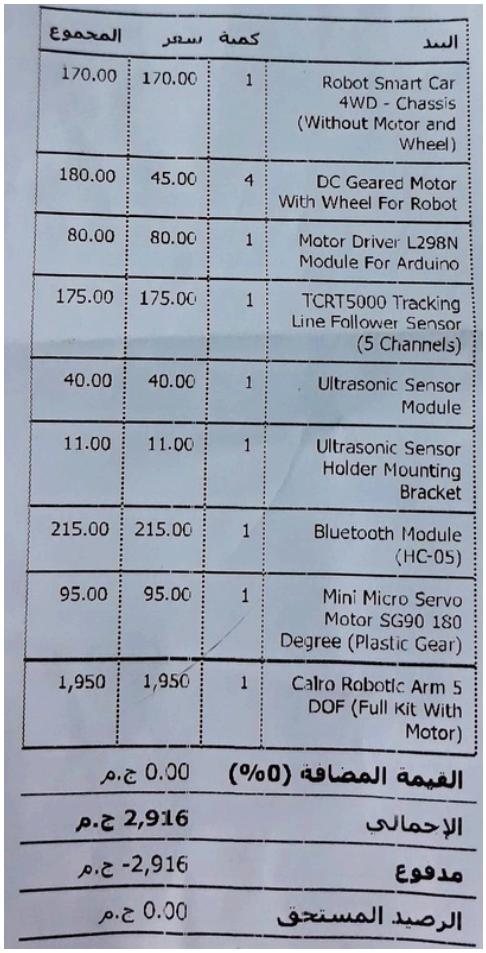
Bill of Materials (BOM)

The following table provides a detailed breakdown of all components and materials used in the robot:



البند	كمية	سعر	المجموع
Robot Smart Car 4WD - Chassis (Without Motor and Wheel)	1	170.00	170.00
DC Geared Motor With Wheel For Robot	4	45.00	180.00
Motor Driver L298N Module For Arduino	1	80.00	80.00
TCRT5000 Tracking Line Follower Sensor (5 Channels)	1	175.00	175.00
Ultrasonic Sensor Module	1	40.00	40.00
Ultrasonic Sensor Holder Mounting Bracket	1	11.00	11.00
Bluetooth Module (HC-05)	1	215.00	215.00
Mini Micro Servo Motor SG90 180 Degree (Plastic Gear)	1	95.00	95.00
Calro Robotic Arm 5 DOF (Full Kit With Motor)	1	1,950	1,950
القيمة المضافة (0%)		0.00 ج.م	
الإجمالي		2,916 ج.م	
مدفوع		-2,916 ج.م	
الرصيد المستحق		0.00 ج.م	

Component	Quantity	Unit Price (EGP)	Total Price (EGP)	Supplier	Notes
Microcontrollers (Arduino Uno)	2	370	740	Local	Cost-effective alternative to Arduino Mega

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Motor Drivers (H-Bridge L298N)	1	80	80	Local	Efficient motor control
DC Motors with wheels	4	45	180	Local	Power-efficient motors
Servo Motors (SG91R)	70	3	210	local	Ensures precise control for small parts of the arm
Servo Motors (MG996R)	3	160	480	Local	Ensures precise control for big parts of the arm
IR Sensors (5-Channel Array)	1	175	175	Local	Used for line tracking
Ultrasonic Sensor	1	40	40	Local	Used for obstacle detection

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Bluetooth Module (HC-05)	1	215	215	local	Enables wireless control
Battery	6	25	150	Local	Reliable power source
BMS Circuit	1	130	130	Local	Battery management system
Acrylic Chassis (Two layers)	1	170	170	Local	Lightweight and durable
ARM	1	750	750	Local	Essential for robot movement
Servo Motor (SG90)	1	95	95	Local	Small and efficient

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Miscellaneous (Wiring, Connectors, Switches, Indicators, etc.)	Multiple	-	150	Local	Various essential components
Ultrasonic sensor holder	1	11	11	local	hold the ultrasonic sensor for safe rotation
Total Cost	-	-	**EGP 3576**	-	**Within budget**

Notes

- **The two Arduino Uno boards used in the project were previously owned from a past project, which eliminated their cost from our budget.**
- **The batteries used in the robot were also repurposed from a previous project, further reducing the overall expenses.**

By implementing these strategies and sourcing components carefully, we successfully reduced costs to 2686 while maintaining a high level of efficiency.

Conclusion

By carefully selecting components and employing innovative cost-saving strategies, we successfully optimized the robot's cost without compromising functionality. Our choices ensured high efficiency while staying within the allocated budget, demonstrating effective financial planning and resource utilization.