Thakur Educational Trust's (Regd.)
THAKUR RAMNARAYAN
COLLEGE OF ARTS & COMMERCE
NAAC Accredited & ISO 21001:2018 Certified
Thakur Ramnarayan Educational Campus, S.V. Road, Dahisar (East), Mumbai - 400 068
Tel: 022 2828 1200 | Fax: 022 2828 1300 | www.trcac.org.in

Hack Crypt 2026

By DevClub TRCAC

PROBLEM STATEMENTS (PS)

➔ PS 1

Category: Cybersecurity
PS ID: HC-101
PS Title: Advanced Web Application Vulnerability Scanner
Level: High

Description:

Design and develop an advanced automated web application vulnerability scanner capable of dynamically analyzing modern web applications to identify critical security weaknesses. The system should detect vulnerabilities including OWASP Top 10, authentication and session management flaws, access control issues, insecure configurations, and client-side security risks.The scanner should be able to find bugs such as SQL Injection (SQLi), Cross-Site Scripting (XSS), Server-Side Template Injection (SSTI), Client-Side Template Injection (CSTI), Remote Code Execution (RCE), OAST, Broken Access Control (BAC), Broken Object Level Authorization (BOLA), and many more.It must perform intelligent crawling and attack surface discovery (including authenticated areas), accurately categorize vulnerabilities based on severity, exploitability, and confidence level, and minimize false positives through in-depth request–response analysis. The tool should generate detailed, developer-friendly reports with actionable remediation guidance and secure coding recommendations, comparable to enterprise-grade tools like Burp Suite, ZAP, or Acunetix.

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➔ **PS 2**

Category: Cybersecurity
PS ID: HC-102
PS Title: Intelligent Security Operations Monitoring and Incident Response Platform
Level: Medium

Description:

Develop a simplified yet effective Security Operations Center (SOC) platform that collects, aggregates, and analyzes security logs from diverse sources such as servers, end, network devices, and security tools. The system should normalize incoming data and continuously monitor for suspicious or malicious activities using rule-based correlation and basic intelligent techniques. It must prioritize alerts based on severity, frequency, and potential impact to help analysts focus on the most critical incidents. The platform should also demonstrate partial automation in incident handling, such as alert enrichment, classification, or notifications, and present insights through clear dashboards or structured reports that support timely incident detection and response. The solution should reflect real-world SOC workflows while remaining accessible in complexity for a medium-level hackathon challenge.

➔ PS 3

Category: Cybersecurity
PS ID: HC-103
PS Title: Comprehensive Phishing and Malicious Content Detection Platform
Level: Low

Description:

Develop a web and browser-based tool that helps users detect potential phishing attacks and malicious content across emails, websites, and downloaded files. The system should analyze URLs, domains, and SSL/TLS certificates to evaluate legitimacy, query threat intelligence sources like Virus Total to check for known malicious files or domains and inspect files before downloading for potential malware. Each entity - email, URL, domain, or file - should be assigned a risk score based on suspicious indicators, severity, and reputation data. Optionally, implement a browser extension that provides real-time warnings when users visit high-risk sites, download unsafe files, or encounter potentially malicious links. The platform should present results in an intuitive dashboard with actionable recommendations, helping users and organizations proactively avoid phishing attacks, malware infections, and credential compromise. The solution should emphasize automation, threat integration, and user-friendly reporting, simulate real-world phishing detection systems while remain accessible for hackathon-level implementation.

➔ **PS 4**

Category: AI / ML
PS ID: HC-201
PS Title: Deepfake Detection and Media Authenticity Analyzer
Level: High

Description:

Develop an advanced AI/ML system capable of detecting and analyzing deep-fake images and videos with high accuracy under real-world conditions. The solution should manage diverse media formats, resolutions, and compression artifacts, and be robust against adversarial manipulations, such as slight facial warping, subtle frame interpolation, or style-transfer attacks. Participants are expected to build models that can classify media as authentic or manipulated, assign confidence score, and optionally localize manipulated regions within the content. Beyond simple classification, the system should leverage multi-modal signals such as audio-visual inconsistencies, temporal irregularities in videos, metadata anomalies, and noise patterns. Bonus challenges include detecting synthetic voice or lip-sync tampering, tracking multi-stage manipulations, and providing explainable insights for each flagged media to support forensic investigation. The final solution should demonstrate scalability, robustness to adversarial attacks, and applicability in real-world social media, news, and digital content verification scenarios, challenging participants to push the boundaries of current deepfake detection research.

➔ **PS 5**

Category: AI / ML
PS ID: HC-202
PS Title: Real-Time Multi-Modal Emotion and Sentiment Analysis System
Level: Medium

Description:

Develop an intelligent AI system capable of analyzing audio and/or video inputs in real time to detect and classify human emotions and sentiments with high accuracy. The system should process multi-modal signals such as speech tone, pitch, and prosody from audio, as well as facial expressions, gestures, and micro-expressions from video. Participants should build models that can output emotion labels and sentiment scores, with confidence metrics for each prediction. The platform should manage noisy environments, multiple speakers, and different lighting conditions, demonstrating robustness in real-world scenarios. Bonus challenges include tracking changes in sentiment over time, analyzing group interactions, generating visual or textual summaries, and providing actionable insights for applications like customer experience enhancement, content analysis, or behavioral research. The solution should demonstrate real-time processing capability, scalability, and interpretability, pushing participants to combine computer vision, speech processing, and deep learning techniques effectively.

➔ **PS 6**

Category: AI / ML
PS ID: HC-203
PS Title: AI-Powered Fake News Text Classification and Credibility Analysis
Level: Low

Description:

Develop an AI-based system that can detect fake or misleading news articles and social media posts. The system should analyze textual content for semantic inconsistencies, sensational language, factual discrepancies, and source credibility. Participants should build a model capable of classifying content as credible, partially credible, or false, and provide a confidence score. Bonus challenges include integrating multi-modal signals such as accompanying images or videos, evaluating author reliability, and generating explainable insights highlighting why content was flagged. The final solution should demonstrate robustness across topics, languages, and content sources, simulating real-world misinformation detection.

➔ PS 7

Category: EdTech
PS ID: HC-301
PS Title: Intelligent Student Attendance Verification System
Level: High

Description:
Develop an intelligent attendance management system for colleges that ensures accurate and tamper-resistant attendance tracking using multi-factor verification. The system should support attendance marking through facial recognition, student ID card validation, and fingerprint authentication (simulated or fake data) to demonstrate biometric workflows without requiring real hardware. The solution should be capable of detecting and preventing proxy attendance, handling variations in lighting, facial appearance, and camera quality, and validating identity consistency across multiple factors. Attendance records should be stored securely and presented through dashboards and reports for faculty and administrators. Bonus features can include liveness detection, attendance analytics, anomaly detection (e.g., repeated failed attempts), and integration with classroom or lab sessions. The final system should demonstrate reliability, privacy awareness, and real-world applicability, simulating how modern smart campuses manage secure attendance at scales.

➔ PS 8

Category: EdTech
PS ID: HC-302
PS Title: Integrated Campus Placement Management Portal
Level: Low

Description:

The proposed system is a centralized web-based Placement Management Portal designed for colleges to efficiently manage and monitor the entire campus placement process. The platform enables students to create comprehensive profiles by adding resumes, skills, projects, certifications, internships, academic details, and job preferences. Students can view available job opportunities, apply to eligible roles, track their application status, and receive notifications related to placement drives, interviews, shortlists, and announcements. The portal provides the Placement Cell and Placement Head with complete visibility over student participation and recruiter activities. Placement authorities can view which students are applying to which companies, access resumes, shortlist candidates, post job opportunities, send notifications, and generate reports for better decision-making. Real-time dashboards help in tracking placement progress and managing multiple recruitment drives efficiently. Recruiters are given secure access to post job openings, view eligible student profiles, filter candidates based on required criteria, and coordinate with the placement team. By digitizing student information, recruitment workflows, and communication, the system reduces manual effort, improves transparency, and ensures a structured, efficient, and scalable placement process for educational institutions.

➔ **PS 9**

Category: EdTech
PS ID: HC-303
PS Title: Gamified Learning & Quiz Platform
Level: Medium

Description:

Develop an interactive, gamified learning platform for school or college students that turns studying into an engaging and competitive experience. The system should allow users to take quizzes, solve challenges, and participate in educational games based on their syllabus or subjects of interest. Implement features such as leaderboards, badges, and achievements to motivate students and track progress over time. The platform should support personalized question difficulty based on student performance, offer feedback for incorrect answers, and allow for multi-player or classroom competitions. Bonus challenges include integrating adaptive learning paths, analytics dashboards for teachers to monitor class performance, and recommendation of topics or practice exercises based on individual weaknesses. The final solution should demonstrate a balance of fun, engagement, and educational value, encouraging continuous learning through gamification principles.

➔ PS 10

Category: EdTech
PS ID: HC-304
PS Title: Automated Academic Timetable Generator
Level: Low

Description:

Develop a web or desktop application that automatically generates academic timetables for schools or colleges, reducing manual effort and minimizing scheduling conflicts. The system should consider teacher availability, classroom capacity, course requirements, and student group constraints, ensuring that no teacher or classroom is double-booked. The platform should optimize the timetable to balance workload across days and prevent overlapping classes for students or faculty. Bonus features could include handling elective courses, lab schedules, extra-curricular activities, shift timings, and automatic rescheduling in case of changes. The system should provide a clear, user-friendly interface for administrators to review, modify, and export timetables in multiple formats. The final solution should demonstrate robust scheduling logic, conflict resolution, and scalability for institutions of various sizes.

➔ PS 11

Category: EdTech
PS ID: HC-305
PS Title: Collaborative Peer Learning & Study Group Platform
Level: Low

Description:

Develop a lightweight platform that enables students to find peers studying similar subjects or topics and collaborate effectively through virtual or in-person study sessions. The system should allow students to create or join study groups, share and rate notes, summaries, or learning resources, and search content using tags or keywords for easy access. Additional features can include discussion threads, collaborative task management, and notifications for upcoming study sessions. The platform should encourage peer-to-peer learning, knowledge sharing, and community engagement while maintaining simplicity and ease of use. Bonus challenges include integrating real-time chat, collaborative whiteboards, or progress tracking to make learning more interactive and measurable. The final solution should demonstrate how students can effectively collaborate and learn together, fostering an engaged learning community.

➔ **PS 12**

Category: Fintech
PS ID: HC-401
PS Title: Comprehensive Personal Finance & Tax Management Platform
Level: High

Description:

Develop a **web or mobile platform** that helps users **manage all aspects of their personal finances** in a single place. The system should allow users to **track income, expenses, and transactions** from multiple sources such as Gay, Ponape, Paytm, bank accounts, and cards, categorizing them automatically for better visibility. It should provide **practical recommendations** for budgeting, saving, and improving credit score (CIBIL) using rule-based calculations. The platform should assist users with **tax compliance**, including tools for **ITR preparation, tax-saving suggestions, and reminders for deadlines**. Additional features could include **goal-based savings planning, loan management, alerts for overspending, investment tracking, and simple financial analytics dashboards**. Security, privacy, and data integrity should be ensured, while keeping the platform **easy to use for everyday users**. The final solution should demonstrate how automation, organization, and actionable financial insights can help users **plan effectively, save money, and maintain healthy financial habits**.

➔ PS 13

Category: Fintech
PS ID: HC-402
PS Title: Automated Digital KYC & Onboarding Platform
Level: Medium

Description:

Design an automated digital KYC (Know Your Customer) system that enables fast, secure, and user-friendly onboarding for financial platforms. The system should allow users to submit identity documents (e.g., Aadhaar, PAN, passport, or driver's license) digitally and verify them automatically. Core functionalities should include document verification, facial matching/selfie verification, and fraud detection to prevent identity theft or spoofing. The platform should ensure compliance with regulatory standards, maintain data privacy and security, and generate a verification report indicating the authenticity of the submitted documents and the verification status. Bonus features can include liveness detection, multi-factor authentication, integration with banking APIs, and historical verification logs. The solution should demonstrate robustness, scalability, and real-world applicability, simulating the onboarding workflow of modern fintech or banking applications.

➔ **PS 14**

Category: Fintech
PS ID: HC-403
PS Title: Immersive AR/VR Learning Platform
Level: Low

Description:

Develop an AR/VR-based learning platform that enhances education by providing immersive and interactive experiences. The system should allow students to visualize complex concepts, practice skills, or simulate real-world scenarios in a virtual environment. Practical applications can include finance education (simulating trading or budgeting scenarios), skill training (laboratory experiments, machinery operation, or medical simulations), or scenario-based learning for subjects like history, geography, or business. The platform should support user interaction, guided exercises, and progress tracking, allowing learners to practice and experiment safely while receiving feedback. Bonus features could include multi-user collaboration, gamified challenges, real-time analytics, and integration with existing course materials. The solution should demonstrate how AR/VR technologies can transform traditional learning into an engaging, hands-on, and measurable educational experience.

➔ PS 15

Category: Health tech
PS ID: HC-501
PS Title: Next-Gen Smart Health Tracker & Wellness Platform
Level: High

Description:
Develop a comprehensive health tracking platform that allows users to monitor, analyze, and improve their overall wellness by tracking a wide range of daily health parameters, including steps, distance, physical activity, heart rate, sleep duration and quality, water intake, calorie consumption, stress levels, and mood. The system should provide personalized health insights and actionable recommendations, helping users set and achieve personal fitness and wellness goals. Users should be able to log workouts, track calories burned, record meals and hydration, analyze sleep patterns, monitor stress and mental health through mood tracking and guided meditation, and receive alerts for unusual patterns such as low activity, high heart rate, or irregular sleep. The platform should include analytics and visualizations, offering trend analysis, weekly and monthly summaries, and comparative insights to help users understand progress over time. It should support goal setting, challenges, and gamification, such as leaderboards, badges, and social engagement features to motivate healthy habits. Additionally, the system should integrate with wearable devices and other fitness apps to enrich data, allow users to log medical reports, medications, and vaccination schedules, and provide reminders for checkups and routine health activities. The platform must ensure secure storage of sensitive health data, real-time updates, and cross-platform usability, while optionally offering predictive insights or recommendations based on historical patterns to guide users toward better lifestyle choices. The final solution should demonstrate scalability, interactivity, and practicality, combining comprehensive tracking with actionable guidance to help users achieve measurable health improvements.

➔ **PS 16**

Category: Health tech
PS ID: HC-502
PS Title: Patient Management & Mental Health Tracker for Doctors
Level: Medium

Description:

Develop a web or mobile platform that enables doctors to efficiently manage their patients' health records, treatments, and mental wellness. The system should allow doctors to store and track patient profiles, including personal details, medical history, ongoing treatments, prescribed medications, lab reports, and appointment schedules. Doctors should be able to monitor physical health parameters such as vital signs, blood pressure, sugar levels, and other condition-specific metrics, as well as track mental health indicators, including stress, anxiety, mood, and therapy sessions. The platform should support treatment planning, where doctors can assign medications, schedule follow-ups, and set reminders for both patients and them. Additionally, it should provide visual dashboards and analytics to track patient progress over time, identify warning signs, and manage multiple patients efficiently. Bonus features could include medication reminders for patients, mental wellness exercises, teleconsultation integration, notes and document uploads, and alerts for abnormal health trends. The system should ensure data privacy, secure storage, and easy accessibility, helping doctors provide better care by combining physical and mental health management in a single platform.

➔ PS 17

Category: Health tech
PS ID: HC-503
PS Title: AI-Powered Mental Health & Wellness Chatbot
Level: Low

Description:

Develop an AI-powered chatbot that provides users with basic support for stress, anxiety, and mental well-being. The chatbot should be able to interactively engage with users, understand their emotional state through text-based conversations, and provide personalized self-care recommendations such as mindfulness exercises, breathing techniques, mood tracking, journaling prompts, or relaxation activities. The system should allow users to log in with mood changes over time, track patterns, and receive suggestions to improve mental wellness. Bonus features could include integration with professional help resources, reminders for therapy or self-care routines, crisis response guidance, conversational memory for personalized interactions, and analytics dashboards for users to visualize their mental health trends. The platform should ensure privacy, data security, and ethical handling of sensitive mental health information. The final solution should demonstrate how AI can support proactive mental wellness, provide actionable guidance while complement, not replacing, professional care.

➔ PS 18

Category: Blockchain
PS ID: HC-601
PS Title: Blockchain-Based Transparent Crowdfunding Platform
Level: Medium

Description:

Develop a decentralized crowdfunding platform leveraging blockchain technology and smart contracts to ensure transparency, trust, and automation in fundraising campaigns. The platform should allow campaign creators to launch projects with clear goals, timelines, and funding targets, while enabling contributors to track their donations securely and verify fund usage. Using smart contracts, the system should automate fund release based on predefined milestones or conditions, preventing misuse of collected funds. The platform should provide auditable transaction history, immutable records of contributions, and real-time updates on project progress. Bonus features could include tiered rewards for contributors, multi-currency support, escrow mechanisms, and voting mechanisms for fund allocation decisions. The system must ensure security, decentralization, and ease of use, demonstrating how blockchain can build trust and accountability in crowdfunding. The final solution should highlight practical implementation, robust smart contract design, and transparency for both creators and contributors.

➔ PS 19

Category: Other
PS ID: HC-701
PS Title: IoT (Open Innovation)
Level: Medium

Description:
Develop an Open Innovation IoT platform where users can present ideas and build innovative IoT-based solutions.