GEN AI Problem Statements

01. Interactive AI Dungeon Master

Context: Tabletop role-playing games like Dungeons & Dragons require a human Game Master to create a story, manage rules, and react to players, which is a complex and time-consuming role.

Task: Build an AI that can act as a dynamic Game Master, generating a cohesive narrative, controlling non-player characters (NPCs), and adapting the world based on player actions in real-time.

Features:

- Maintain a consistent world state, including characters, locations, and inventory.

- Generate dynamic NPC dialogue and actions based on player interactions.

- Create branching story quests and random encounters based on a high-level theme.

02. Generative UI/UX Design System

Context: Designing and prototyping a user interface for a new app or website involves significant manual effort from designers and front-end developers.

Task: Create a system that generates complete, functional UI/UX mockups and front-end code from a simple text description of the desired application.

Features:

- Input: "A sign-up page for a coffee subscription app."

- Generate a visual layout (UI), user flow (UX), and corresponding HTML/CSS/JS code.

- Ensure the design follows modern accessibility and usability principles.

03. Automated Animated Video Creator

Context: Creating even a short animated video requires a team of scriptwriters, artists, animators, and voice actors.

Task: Build a tool that generates a short, animated video from a text script, complete with characters, scenes, voice-overs, and background music.

Features:

- Input a script with scene descriptions and character dialogue.

- Generate character designs, animated scenes, and synthesized speech for dialogue.

- Option to choose animation style (e.g., 2D cartoon, whiteboard, anime).

04. Scientific Hypothesis Generator

Context: Researchers spend years reviewing existing literature to identify gaps and formulate new hypotheses, a key bottleneck in scientific discovery.

Task: Design a system that ingests a corpus of scientific papers on a specific topic and

generates novel, testable hypotheses.

Features:

- Input a collection of research papers (PDFs) or a research topic.

- AI identifies contradictions, unexplored connections, and gaps in the existing literature.

- Output is a list of plausible hypotheses with supporting rationale from the source papers.

05. Generative CAD Model Creator for Engineering

Context: Mechanical engineers and industrial designers create 3D models using complex CAD software, which requires specialized training and significant time.

Task: Build a tool that generates 3D CAD models (e.g., in STEP or STL format) from technical specifications described in natural language.

Features:

- Input a prompt like: "Generate a bicycle frame for a 6-foot-tall person, optimized for aerodynamics and low weight."

- Output a valid 3D model that meets the specified engineering constraints.

- Option to run basic simulations (e.g., stress analysis) on the generated model.

06. Realistic Dialogue Generator for Simulations

Context: Training simulations for professionals like doctors, negotiators, or customer service agents require realistic and dynamic conversation partners to be effective.

Task: Build an AI that can play the role of a character in a simulation, generating realistic, context-aware dialogue that adapts to the user's responses.

Features:

- Input a scenario and a character profile (e.g., "an angry customer whose package is late").

- AI generates responses that are consistent with the character's personality and the situation.

- The conversation can branch in multiple directions based on the user's choices.

07. AI Composer for Multi-Instrumental Arrangements

Context: Composing music is a creative act, but arranging a piece for multiple instruments (orchestration) is a highly technical skill requiring music theory knowledge.

Task: Develop a tool that takes a simple melody and generates a full musical arrangement for a specified ensemble (e.g., string quartet, rock band, orchestra).

Features:

- Input a MIDI or audio file containing a single melody line.

- Generate harmonizing parts for different instruments, including percussion.

- Output a multi-track MIDI file or a complete audio mix.

08. Generative Drug Discovery Platform
Context: Discovering new drug molecules is an incredibly expensive and lengthy process, with a high failure rate.
Task: Build a system that generates novel molecular structures that are optimized to bind to a specific biological target and have drug-like properties.
Features:

- Input a target protein structure and desired chemical properties.

- Generate new, synthesizable molecules predicted to be effective and non-toxic.

- Provide a "synthesis pathway" suggesting how the molecule could be created in a lab.

09. AI for Software Refactoring and Modernization
Context: Many companies rely on legacy codebases (e.g., written in COBOL or old Java) that are inefficient and difficult to maintain.
Task: Create a system that automatically refactors and modernizes an entire legacy codebase into a new language or architecture without changing its core functionality.
Features:

- Input a codebase from an old language (e.g., Java 6).

- AI analyzes the code, understands its logic, and rewrites it in a modern language (e.g., Python or Go) using current best practices.

- Generate unit tests to verify that the new code behaves identically to the old code.

10. AI World Builder for Game Development
Context: Creating large, detailed, and believable open worlds for video games requires thousands of hours of work from artists and designers.
Task: Build a generative tool that creates entire 3D worlds, including terrain, cities, forests, and ecosystems, based on high-level parameters.
Features:

- Input parameters like climate, historical era, and magic level.

- Generate coherent landscapes, procedural buildings, and unique flora and fauna.

- Populate the world with AI-driven NPCs that have their own daily routines and goals.

11. Code Comment & Docstring Generator
Context: Developers often find writing documentation and comments for their code to be a tedious and time-consuming task.
Task: Build a tool that automatically generates comments and docstrings for code snippets in various programming languages.
Features:

- Accept code input in Python, JavaScript, or Java.

- Generate line-by-line comments and a function docstring.

- Option to choose comment style (simple, detailed).

12. Test Data Generator for Developers

Context: Developers and testers need realistic dummy data to test applications, but creating it manually is inefficient.

Task: Build a tool that generates fake but structurally correct data (e.g., CSV, JSON) based on user-defined schemas.

Features:

- Input data fields (e.g., name, email, date, country).

- Specify the number of rows to generate.

- Output data in CSV or JSON format.

13. Brand Story and "About Us" Page Generator

Context: New businesses and startups need to craft a compelling brand story for their website's "About Us" page, but often struggle to articulate their mission and vision.

Task: Create a tool that generates a complete "About Us" page narrative from a few key details about a company.

Features:

- Input company name, industry, founding story (in brief), and core values.

- Generate a 3-4 paragraph brand story that is engaging and professional.

- Option to choose a tone (e.g., innovative, traditional, community-focused).

14. Meeting Agenda and Summary Generator

Context: Professionals spend significant time creating agendas before meetings and writing minutes afterward.

Task: Create a tool that generates a meeting agenda from a topic and then summarizes the key discussion points from a transcript.

Features:

- Input meeting topic to generate an agenda.

- Input a transcript to generate a summary.

- Output summary as bullet points with action items.

15. "Explain Like I'm 5" (ELI5) Tool

Context: Complex topics in science, technology, or finance can be difficult for beginners to understand.

Task: Design a system that simplifies complex text into an easy-to-understand explanation using simple language and analogies.

Features:

- Paste a paragraph of complex text.

- AI generates a simplified explanation.

- Option to adjust the simplicity level (e.g., for a 10-year-old).

16. Job Description Generator for HR

Context: HR managers and recruiters need to write clear and appealing job descriptions to attract the right talent.

Task: Build a tool that generates a complete job description from a role title and key responsibilities.

Features:

- Input job title, department, and key skills required.

- Generate sections for responsibilities, qualifications, and company bio.

- Option to select a formal or casual tone.

17. Podcast Intro/Outro Script Writer

Context: Podcasters need consistent and engaging introductions and conclusions for their episodes.

Task: Create a generator for podcast intro and outro scripts.

Features:

- Input podcast name, episode title, and host name.

- Generate a short script for the intro and outro.

- Option for different styles (e.g., energetic, story-telling).

18. Character Backstory Generator for Writers

Context: Novelists and game designers need to create deep, believable characters but can struggle with developing their history.

Task: Build a tool that generates a detailed backstory for a fictional character.

Features:

- Input a character's name, archetype (e.g., hero, mentor), and a core trait.

- Generate a 2-4 paragraph backstory including motivations and flaws.

- Option to choose a genre (e.g., fantasy, sci-fi).

19. Debate Argument Generator

Context: Students and debaters need to quickly brainstorm arguments for and against a particular topic.

Task: Create a tool that generates key arguments for a given debate motion.

Features:

- Input a debate topic (e.g., "AI is good for humanity").

- Generate 3-4 points for the "pro" side and 3-4 points for the "con" side.

- Output includes a brief explanation for each point.

20. Error Message Explainer for Non-Tech Users

Context: Technical error messages from software are often cryptic and unhelpful to the average user.

Task: Build a tool that translates confusing error messages into plain, actionable language.

Features:

- User pastes an error code or message (e.g., "404 Not Found").

- AI explains what the error means in simple terms.

- Suggests 1-2 possible steps to fix the issue.

21. Learning Path Generator

Context: Someone wanting to learn a new skill often doesn't know where to start or what to learn next.

Task: Create a tool that generates a structured, step-by-step learning path for a given topic.

Features:

- Input the skill you want to learn (e.g., "Learn Python").

- Generate a curriculum from beginner to advanced topics.

- Output is a checklist of concepts and project ideas.

22. User Persona Generator for UX Designers

Context: UX/UI designers need to create user personas to guide their design process, which can be time-consuming.

Task: Build a tool that generates fictional user personas for a specific product or service.

Features:

- Input the product type (e.g., "food delivery app").

- Generate a persona with a name, demographics, goals, and frustrations.

- Option to generate multiple different personas.

23. Ethical Dilemma Scenario Generator

Context: Educators and trainers need interesting scenarios to discuss ethics, especially in technology and business.

Task: Design a system that creates short, thought-provoking ethical dilemmas.

Features:

- Choose a domain (e.g., AI, medicine, journalism).

- Generate a one-paragraph scenario presenting a moral conflict.

- Include 2-3 discussion questions related to the dilemma.

24. Personalized Travel Itinerary Creator

Context: Travelers often spend hours researching and planning a trip itinerary.

Task: Create a tool that generates a daily travel itinerary based on destination and interests.
Features:

- Input city, trip duration, and interests (e.g., history, food).

- Generate a day-by-day plan with suggested attractions and activities.

- Option to specify a budget (e.g., budget-friendly, luxury).

25. Presentation Content Generator from Outline

Context: Creating the content for a presentation is time-consuming, even after the main structure is decided.
Task: Build a tool that expands a simple outline into full slide content, including speaker notes.
Features:

- Input a list of slide titles or bullet points.

- AI generates detailed content for each slide.

- Option to generate accompanying speaker notes for the presenter.

26. E-commerce Product Description Writer

Context: Online sellers need compelling and unique product descriptions to attract customers, but writing them for hundreds of items is challenging.
Task: Create a system that generates an engaging product description from a list of features.
Features:

- Input product name and key features (e.g., material, size).

- Generate a 2-3 sentence marketing-friendly description.

- Option to set a tone (e.g., professional, playful).

27. Two-Sentence Horror Story Generator

Context: A popular creative writing challenge is to write a complete horror story in just two sentences.
Task: Develop a tool that generates original, two-sentence horror stories based on a keyword.
Features:

- Input a theme or keyword (e.g., "mirror," "doll," "basement").

- Generate 3-5 different short horror stories.

- Option to share the best story on social media.

28. Personalized Email Signature Generator

Context: Creating a professional and visually appealing email signature can be tricky for many people.
Task: Build a tool that generates a formatted email signature from a user's personal details.
Features:

- Input name, title, company, phone number, and social media links.

- Generate an HTML signature that can be copied and pasted.

- Offer several professional templates to choose from.

29. "Would You Rather" Question Generator

Context: "Would You Rather" is a fun conversation game, but it can be hard to think of interesting and balanced questions on the spot.

Task: Create a generator that produces entertaining and thought-provoking "Would You Rather" questions.

Features:

- Choose a category (e.g., silly, impossible, philosophical).

- Generate a question with two compelling choices.

- A "random" button to generate from all categories.

30. Acronym and Abbreviation Explainer

Context: Many industries are full of acronyms and jargon that are confusing to newcomers.

Task: Design a simple tool that explains the meaning of an acronym in a specific context.

Features:

- Input an acronym (e.g., "API") and an optional field (e.g., "software").

- AI provides the full name and a simple one-sentence explanation.

- Include an example of how the term is used in a sentence.