# MESA DAY CONTEST RULES 2026-2027
(FINAL)

# AI & Health Disparities Challenge

**LEVEL:** High School

**DIVISION(S):** Grades 9-12 (combined)

**COMPOSITION OF TEAM:** 2-3 students per team

**NUMBER OF TEAMS:** Preliminary – Determined by your local MESA center
Regional – # of teams per division at the discretion of each region (Northern, Central, LA/Central Coast, and Southern)

**SPONSORS:** University of California Davis MESA College Prep
University of California San Francisco MESA College Prep

**OVERVIEW:** Changes, if any, from "DRAFT" rules are highlighted in "yellow." Welcome to the **AI & Health Disparities** Challenge! In this competition, students will address real-world health disparities by analyzing public datasets. Teams will use data analysis tools like Python with the Pandas library and the power of AI chatbots to explore how Social Determinants of Health (SDOH) impact specific populations. In preparation, students will complete a CodeHS course covering SDOH, data analysis fundamentals, and how to leverage AI chatbots for insights. The challenge culminates on MESA Day, where teams will deliver a presentation of their findings and propose a data-driven solution to a panel of judges. **Participation logistics, limits, and competition facilities may vary by host site. Advisors and students are responsible for verifying this information with their local MESA center.**

**PROMPT:** Investigate how specific *social determinants* (e.g., poverty, discrimination, healthcare access, etc.) contribute to disparities in *one health outcome* for *two different populations or regions* in the **United States**. Using AI chatbots, analyze datasets to identify patterns and create graphs and tables. Propose solutions to reduce these inequities based on your findings.

**MATERIALS:** For the research and presentation:

- Computer with Internet access
- Access to a generative AI chatbot (e.g., Gemini, ChatGPT, etc.)
- Google Slides or other presentation software
- May not include pre-completed analysis, work completed by others, or projects that have been used in previous competitions.
- Submitted digital slide presentation in advance by the deadline as determined by the Host Center


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The Host Center will provide the following:

- Internet enabled computer suitable for presentations and access to online materials
- Projector and screen or television compatible with standard presentation formats
- Connection cables including HDMI, USB, VGA, and any required adaptors. Teams must confirm compatibility with the Host Center.

**GENERAL RULES:**

1) Teams must consist of 2 to 3 students. Teams consisting of 1 (one) student will not be allowed to compete.
2) **ALL team members** must complete at least 90% of the assignments in the specified CodeHS pre-course **one week** prior to the contest date (see "Enrollment Links" attachment/appendix). Failure to meet this requirement will result in the team not being able to compete in the competition.
3) Each team must create a slideshow to present their research on the main competition prompt (provided on Page 1) **OR** the guided challenge prompts (*see Attachment F: Sample Challenge Prompt*). Failure to meet this requirement will result in the team not being able to compete in the competition.
    a. The presentation slides must be submitted in advance by the date specified by the Host Center.
4) Teams must choose **TWO** different **populations or regions** (e.g., urban vs rural, two racial/ethnic groups, men vs. women, etc.) in the United States to examine how the social determinants of health (SDOH) impact the chosen **health outcome** specifically. Teams may combine categories (e.g., "hispanic women vs. white women"). Examples are given below, but the list is not exhaustive:
    a. **Population:** A group of people with common characteristics such as:
        i. **Race/Ethnicity** (e.g., Hispanic, African American, Native American, Asian American, White, etc.)
        ii. **Sex, Gender Identity, or Sexual Orientation (**e.g., women, men, LGBTQ+, etc.)
        iii. **Age Groups (**e.g., elderly, adolescents, youth, etc.)
    b. **Region:** A geographic location where environmental, economic, or policy factors shape health disparities (e.g., urban vs. rural, neighborhoods/cities/states, etc.)
5) Teams must choose **ONE** of the following **health outcomes** to investigate for their project:
    a. **Cancer**: Teams may choose a specific type of cancer for their analysis.
    b. **Type 2 Diabetes**
    c. **Cardiovascular Disease**
    d. **Respiratory Disease**
    e. **Chronic Kidney Disease**
    f. **Obesity**
    g. **Depression**
6) **Social Determinant of Health (SDOH):** Teams must choose **ONE** of the following **social determinants of health** and/or one of their respective subcategories during their population analysis. Students are expected to find correlations between the SDOH and a health outcome in their chosen populations. Please note that some social determinants of health (SDOH) are **interconnected**, meaning one can influence another, showing how they collectively impact a population.


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| Health Care and Quality | Neighborhood and Built Environment | Social and Community Context | Economic Stability | Education Access and Quality |
|---|---|---|---|---|
| - Insurance coverage<br>-Health literacy<br>-Transportation to health care facilities<br>-Copays<br>-Provider availability<br>-Quality of care | -Housing<br>-Transportation<br>-Safety<br>-Walkability<br>-Recreation/Parks<br>-Water Quality<br>-Access to healthy food | -Social and community integration<br>-Support systems<br>-Community engagement<br>-Stress<br>-Discrimination | -Employment<br>-Income<br>-Debt<br>-Expenses<br>-Support<br>-Medical bills | -Higher education<br>-Literacy<br>-Early childhood<br>-Language<br>-Vocational training |

7) **Dataset Requirement:** The analysis must be based on publicly available data. Teams must use:
    a. At least one dataset that includes data on both a **health outcome** and a **social determinant of health** for the chosen **populations/regions**.
    b. Alternatively, at least two separate datasets where one contains health outcome data and the other contains social determinant data, but both datasets must examine the same populations/regions in the same year/time period (i.e., do not combine a 2014 dataset with a 2025 dataset).
    c. Teams are required to use datasets acquired from one of the verified sources listed in Attachment/Appendix C for analysis.
    d. **AI chatbots** to assist with coding based data analysis (e.g., Gemini, ChatGPT, Claude, etc.), but all findings must be student-driven.
8) **Presentation Guidelines**: Each team presents a **5-minute slideshow presentation** (e.g., Google Slides, PowerPoint Presentation, etc.) on the competition date.
    a. Presentation slides must be clearly labeled with the team members' names, grade levels, school, MESA center, and list your competition prompt. A **10% penalty** will be assessed for failure to include this information.
    b. Must address the **competition prompt** directly which includes the following:
        i. The two chosen populations/regions for the analysis.
        ii. The single chosen health outcome being investigated.
        iii. The Social Determinants of Health that are being examined/researched.
    c. Mention of the dataset(s) used, their source, and a justification for why they were chosen.
    d. An **in-depth** analysis of the influence/consequences of the SDOH on the health outcome of choice for both populations/regions of interest.
        i. A comparison of how the same SDOH manifests uniquely in each group/region.
        ii. Explanation of why these differences contribute to disparities in health outcomes.
        iii. Determine which group experiences greater health disparities (i.e., identify the most vulnerable population) supported by the datasets analyzed.
    e. At least two clear insights generated with the help of an AI chatbot, each clearly identified as AI-driven.
    f. One original table with statistics from the dataset used. Teams may use AI chatbots to help come up with the table information.
    g. One original graph (e.g., bar graph, line graph, scatter plot, etc.) using data from the dataset.


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   h. A summary of current programs, laws, or methods being used by governmental entities or non-profits that aim to improve the chosen health outcome disparities in the most vulnerable population/region out of the two analyzed.
   i. Develop a novel intervention proposal to address the disparities affecting the health outcome of choice in the more vulnerable of the two analyzed populations/regions.
   j. All components (b-i) listed above must be verbally addressed during the presentation.
   k. Citations (APA format) for all resources used, including datasets and outside research.
9) Project and presentation slides must be the original work of the students. Judges may ask questions to confirm authenticity.
   a. AI is a tool that can be useful. MESA recognizes that students may choose to use AI for a variety of purposes throughout the competition. Any AI usage should be documented and, if there are questions about the ownership of the materials created, MESA reserves the right to ask for proof of the work. Teams are required to be critical and extend their projects beyond any assistance from artificial intelligence. AI is a tool but, given the personal nature of the work, does not create a full project.

## JUDGING:

1) Prior to the day of the competition, using solely what is visually provided in the slideshow, judges will prescore Category 1: Data Analysis and Category 2: Research Visualization (see Score Sheet).
2) On the day of the competition, each team will have **5 minutes** to present.
   a) Judges will determine team order by random selection and will post the team order prior to the start of competition.
   b) The team must be ready to present when called or forfeit the competition.
   c) Only judges, MESA staff, and competing teams will be allowed in the competition room.
   d) Presentation may not exceed 5 minutes. Once 5 minutes has elapsed, teams will be stopped and prevented from speaking beyond the 5 minute mark.
   e) Judges will provide time signals at the following intervals: one (1) minute, thirty (30) seconds, and five (5) seconds remaining.
   f) If any information from the prescored section is not verbally acknowledged during the presentation, judges reserve the right to adjust the corresponding scores in Category 2.
3) Judges' decisions are final.
4) **TIEBREAKER**: The team scoring the highest cumulative points in Categories 1 (Data Analysis) and 5 (Creative use of AI tools) will be the winner.

## AWARDS:

- Medals will be awarded for 1st, 2nd, and 3rd place based on the highest Overall Score.
- Please check with your MESA center to determine the number of teams that advance to Regional MESA Day.

## ATTACHMENTS/APPENDIX:

- A: Enrollment Links for AI &Health Disparities CodeHS Course
- B: Mathematical Topics
- C: AI & Health Disparities Datasets and Resources
- D: Presentation Template
- E: AI & Health Disparities Specifications Checklist
- F: Sample Guiding Challenge Prompts
- G: Further Exploration/Additional Resources
- H: Scoring Sheet

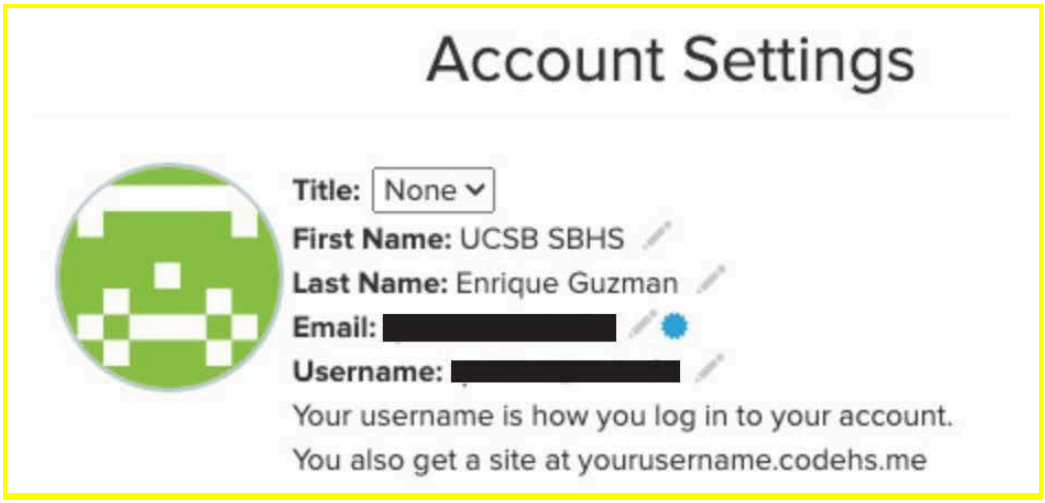

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## A: Enrollment Links for AI & Health Disparities CodeHS Course

### Enrolling Instructions

When enrolling in CodeHS, EACH team member **MUST** include their **MESA CENTER and SCHOOL** in their registration. See below for example:

- **First name field:** Abbreviated MESA center and School Name
- **Last name field:** Student's First and Last Name




### Course Links

Courses have been created to match the MESA region your host center is affiliated with. Please register for your appropriate course:

**Northern California:** For students affiliated with CSU East Bay, RISE, UC Davis, UCSF, Ukiah
Northern Central: https://codehs.com/go/628D6
Enrollment Code: 628D6

**Central California:** For students affiliated with Fresno State, San Jose State, UCSC, University of the Pacific
Central Region: https://codehs.com/go/C70A4
Enrollment Code: C70A4

**Los Angeles / Central Coast:** For students affiliated with CSULA, CSULB, UCLA, UCSB, USC
LA/Central Coast Region: https://codehs.com/go/28AE3
Enrollment Code: 28AE3

**Southern California:** For students affiliated with Imperial Valley, San Diego State, UCI, UCR
South Region: https://codehs.com/go/9345E
Enrollment Code: 9345E


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**B: Mathematical Topics** *(Students should aim to have a fundamental understanding of)*

- Basic Math
  - Addition/subtraction
  - Division/multiplication
- Basic statistics
  - Mean/average
  - Mode
  - Min/max

**C: AI & Health Disparities Datasets and Resources**

This appendix provides a list of verified resources to help teams understand the core concepts of the competition and find relevant data for their analysis. **The resources listed in Appendix C are required sources for the competition**. Teams **MUST USE AND CITE** these resources as part of their research and analysis.

**Understanding Social Determinants of Health (SDOH):** Use these resources to build a strong foundational knowledge of what the Social Determinants of Health are and why they are important for health disparities.

- Centers for Disease Control and Prevention (CDC) - About SDOH
  - Link: https://www.cdc.gov/socialdeterminants/
  - Description: The CDC's main portal for SDOH, offering definitions, background information, and examples of how these factors affect health outcomes.
- Healthy People 2030 - Social Determinants of Health
  - Link: https://odphp.health.gov/healthypeople/priority-areas/social-determinants-health
  - Description: Outlines the U.S. national objectives for improving health and well-being, with a key focus on the five domains of SDOH.

**Key Data Portals & Repositories:** These portals are excellent starting points for finding and exploring a wide range of public health and demographic data at national, state, and local levels.

- County Health Rankings & Roadmaps
  - Link: https://www.countyhealthrankings.org/
  - Description: Provides health data for nearly every county in the nation, allowing for comparisons of health outcomes and the factors that shape them.
- CDC PLACES: Local Data for Better Health
  - Link: https://www.cdc.gov/places/
  - Description: A CDC data source that provides model-based, population-level health data for small areas like counties, cities, and census tracts.
- The Opportunity Atlas
  - Link: https://www.opportunityatlas.org/
  - Description: An interactive tool that maps data on social mobility and economic opportunity by neighborhood, providing powerful insights into community context.

**Specific Datasets and Tools:** These links point directly to valuable datasets that are well-suited for this competition. Many are available in user-friendly formats like CSV.


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- U.S. Chronic Disease Indicators (CDI) on Kaggle
  - Link: https://www.kaggle.com/datasets/cdc/chronic-disease
  - Description: A comprehensive dataset from the CDC containing state and national data on chronic diseases and their risk factors.
- USDA Food Access Research Atlas
  - Link: https://www.ers.usda.gov/data-products/food-access-research-atlas/
  - Description: Maps and provides data on food access indicators, allowing students to investigate "food deserts" and their connection to health.
- Behavioral Risk Factor Surveillance System (BRFSS)
  - Link: https://www.cdc.gov/brfss/
  - Description: The nation's premier system of health-related telephone surveys that collect state data about U.S. residents regarding their health-related risk behaviors and use of preventive services. Datasets are available for download.
- National Health and Nutrition Examination Survey (NHANES) on Kaggle
  - Link: https://www.kaggle.com/datasets/cdc/national-health-and-nutrition-examination-survey
  - Description: A program of studies designed to assess the health and nutritional status of adults and children in the United States, combining interviews and physical examinations.

## D: Presentation Template

Your presentation is not required to be formatted like the template provided below, but you may use or refer to this template as needed: Presentation Template Link

## E: AI & Health Disparities Specifications Checklist

This checklist is provided **ONLY** as a reference for teams to "pre-inspect" their project to ensure they meet the rules specifications. Teams may check-off each of the following items after comparing their competition ready project with the rules. **This checklist will NOT be used by judges.**

- ☐ 2026-2027 rules are used
- ☐ All teams have completed at least 90% of the CodeHS course
- ☐ Submitted the slideshow presentation with the contents specified in the score sheet
- ☐ Correct labeling on slideshow submission that includes:
  - ☐ Team names
  - ☐ Grade
  - ☐ School
  - ☐ Center


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## F: Sample Guiding Challenge Prompts

Below is a set of guiding questions to help teams narrow down their selected dataset.

### Economic Stability and Health Outcomes

- Challenge:
  - Examine correlations between income and health outcomes across regions/populations.
  - Propose a data-driven intervention to reduce economic-related health disparities.

### Education and Health Literacy

- Challenge:
  - Investigate how educational attainment impacts access to preventive healthcare.
  - Suggest policies or programs to improve health literacy in low-education communities.

### Healthcare Access and Quality of Life

- Challenge:
  - Analyze the relationship between healthcare access and quality of life indicators like life expectancy among different regions/populations. Examine how these disparities contribute to poorer health outcomes among chosen populations/regions.
  - Design an outreach plan to improve healthcare access in underserved areas.

### Neighborhood Environment and Chronic Health Conditions

- Challenge:
  - Explore links between environmental factors (e.g., pollution, food access) and chronic conditions.
  - Recommend an initiative to address environmental health concerns in affected areas.

### Social and Community Support in Mental Health Outcomes

- Challenge:
  - Assess whether more community support resources correlate with better mental health outcomes.
  - Propose a program to strengthen social support for mental health.

### Discrimination and Health Disparities

- Challenge:
  - Identify health disparities linked to systemic discrimination across demographic groups and how they contribute to poorer health outcomes in vulnerable populations.
  - Design a public health campaign to address one identified disparity.

### Impact of COVID-19 on Health Disparities

- Challenge:
  - Analyze how COVID-19 highlighted or exacerbated health disparities in certain groups.
  - Recommend strategies for public health agencies to support marginalized communities in future crises.

### Transportation Access and Health Care Utilization

- Challenge
  - Explore how limited transportation in a specific population/region impacts healthcare access and health outcomes.
  - Suggest an initiative to improve transportation access to healthcare


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## G: Further Exploration/Additional Resources

These resources are not a required component of the AI Challenge. However, if you'd like to further explore how AI works, we recommend completing this course:

**Oracle AI Foundations Certification (6 hours)**: Here, you can learn more about how AI functions, how to use it, and how it can be used. By completing this free *Oracle AI Foundations Associate* course, you can also earn certification that can be put on college applications or resumes.

a. **Certification Link:** https://mylearn.oracle.com/ou/learning-path/become-an-oci-ai-foundations-associate/163544

b. **Why is this important?**: Proficiency in artificial intelligence is no longer a niche skill but a standard expectation in the modern workforce. This certification is imperative for the competition as it equips students with a foundational understanding of the different technologies that fall under the AI umbrella, such as Large Language Models (LLMs), machine learning, and deep learning. This knowledge will enable teams to effectively and responsibly use AI tools in their data analysis, moving beyond simple queries to a deeper comprehension of the technology powering their insights.


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## H: SCORE SHEET FOR AI & Health Disparities Challenge

### High School – Grades 9-12

*Copies of this score sheet will be provided by the MESA Day Host Center.*

Student Names: _____ MESA Center: _____

School: _____

TOPIC/PROMPT #:_____

| Required Elements for Presentation | YES | NO |
|---|---|---|
| **CodeHS course:** Each member completed at least 90% | | Unable to compete |
| **Team consist of 2-3 students** | | Unable to compete |
| **Digital presentation slides submitted** | | Unable to compete |
| **Labeling:** Presentation intro includes MESA center, school name, team members names and school grades. | | Minus 10% from final score |
| **Presentation introduces and addresses the competition prompt** | | Unable to place |
| **Dataset(s) used for analysis are acquired from the sources listed in Appendix C** | | Unable to place |
| **Two comparison populations/regions in the United States** | | Unable to place |
| **ONE health outcome discussed** | | Unable to place |

**Prescored Section:** this section will be scored **prior** to the day of the competition solely on what is visually provided in the presentation.

| Category 1: Data Analysis | Meets Criteria (2 points) | Partially Included (1 points) | Not Present (0 point) |
|---|---|---|---|
| **2 visualizations included (graphs and table)** | 2 | 1 | 0 |
| **Dataset usage**: Clearly state dataset used for analysis with in-text citations | 2 | 1 | 0 |
| **Data Science Tools:** Clearly demonstrated usage of Python pandas data science library, matplot data visualization library, etc. | 2 | 1 | 0 |
| **Citations:** Team correctly cites datasets and outside sources used in APA format. | 2 | 1 | 0 |

| Category 2: Research Visualization | Excellent (4 points) | Very Good (3 points) | Good (2 points) | Fair (1 points) | Not Present (0 point) |
|---|---|---|---|---|---|
| **Data table:** Dataset statistics in table format. | 4 | 3 | 2 | 1 | 0 |
| **Graph visualization:** At least one bar, scatterplot, pie chart, or line chart visualization from a dataset that enhances topic understanding. | 4 | 3 | 2 | 1 | 0 |
| **AI-Driven Data Insights:** Two clearly defined data-driven insights from datasets performed by prompting an AI chatbot (e.g. "number of diabetes diagnoses in this rural region). Must state clearly which insights were AI-driven. | 4 | 3 | 2 | 1 | 0 |
| **Current interventions:** Summary of current intervention programs (e.g., laws, gov. programs, non-profits, etc.) | 4 | 3 | 2 | 1 | 0 |


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| **In-Person Presentation Scoring:** this section will be scored during the presentation based on both visuals and the team's verbal analysis of the information presented. | | | | | |
|---|---|---|---|---|---|
| **Category 3: SDOH Critical Thinking** | Excellent (4 points) | Very Good (3 points) | Good (2 points) | Fair (1 points) | Not Present (0 point) |
| **SDOH Manifestation:** Clearly demonstrating how a specific SDOH is manifested in each of the two populations/regions of choice and relates to the health outcome of choice. | 4 | 3 | 2 | 1 | 0 |
| **Disparity Explanation:** Clear explanation of how the differences in SDOH manifestation in each population/region contribute to health disparities. | 4 | 3 | 2 | 1 | 0 |
| **Vulnerability Determination:** Determination of which population/region experiences greater health disparities (most vulnerable group). | 4 | 3 | 2 | 1 | 0 |
| **Category 4: Intervention Proposal** | Excellent (4 points) | Very Good (3 points) | Good (2 points) | Fair (1 points) | Not Present (0 point) |
| **Novel proposal addressing disparities:** Team proposes an innovative intervention to reduce disparities in the more vulnerable population/region. | 4 | 3 | 2 | 1 | 0 |
| **Data-driven Proposal Reasoning:** Team supports their proposal using the datasets of choice and other outside sources. | 4 | 3 | 2 | 1 | 0 |
| **Category 5: Creative use of AI tools** | Excellent (4 points) | Very Good (3 points) | Good (2 points) | Fair (1 points) | Not Present (0 point) |
| **Usage of machine learning for predictive model creation** | 4 | 3 | 2 | 1 | 0 |
| **Automation/Innovation:** (e.g. use of AI agent to find insights, API usage to gather data from database, etc.) | 4 | 3 | 2 | 1 | 0 |
| **Category 6: Presentation** | Excellent (4 points) | Very Good (3 points) | Good (2 points) | Fair (1 points) | Not Present (0 point) |
| **Clarity of Presentation:** Clear, concise, and appropriate explanations; use of meaningful antidotes, statistics, or quotes. | 4 | 3 | 2 | 1 | 0 |
| **Speaking/Delivery:** Transitions smoothly from point to point. Voice projects; clear pronunciation & enunciation. | 4 | 3 | 2 | 1 | 0 |
| **Visual Appeal of Presentation:** Supports & enhances audience understanding of topic; creative; integrated seamlessly into presentation. | | | 2 | 1 | 0 |
| **Team Participation:** All team members participate equally. | 4 | 3 | 2 | 1 | 0 |
| **COLUMN TOTALS:** | | | | | |
| **AI & Health Disparities Score** | | | | | ____/66 |

| **OVERALL SCORE** |
|---|
| AI & HEALTH DISPARITIES SCORE:___/66 |
| **LABELING DEDUCTION (-10%):** ___ |
| **OVERALL SCORE:** *(MISLABELING DEDUCTION):* :___/66 |


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