Our Earthian Age in Different Planets

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Abstract-We know our present age with the help of mathematical calculation from birth to till now but actually what is our age? From normal peoples answer "25 year old" but reality is when earth revolution period the sun's orbit 25 times from birth and that age is called Earthen year. Kepler's laws of planetary motion provide a fundamental framework for understanding the dynamics of celestial bodies within our solar system. these laws describe the elliptical orbits of planets around the Sun, the relationship between a planet's speed and its distance from the Sun, and the mathematical correlation between orbital periods and distances.

Keywords - Earth year, kepler s law of motion, planetary Motion, Dynamics, Elliptical Orbits, Orbital Periods, Orbits.

INTRODUCTION

The concept of time and age takes on a fascinating new dimension when we venture beyond Earth's boundaries and consider the vast expanse of our solar system. While humans measure their age in Earth years, the same calculation wouldn't apply on other planets due to their unique orbital periods and rotational cycles, a phenomenon intricately governed by Kepler's laws of planetary motion. Johannes Kepler's groundbreaking work revealed that planets follow elliptical orbits around the Sun, with their speeds varying based on their distance from the Sun. This fundamental understanding of celestial mechanics plays a crucial role in calculating human age on different planets. By applying Kepler's laws, we can determine the orbital periods of planets and, in turn, calculate how old a person would be if they lived on Mercury, Mars, Jupiter, or other planets in our solar system. This thought-provoking exploration highlights the complexities and wonders of timekeeping in a cosmic perspective, showcasing the relativity of time and its dependence on celestial mechanics. As we embark on this intriguing journey, we'll discover how Kepler's laws not only govern planetary motion but also influence our perception of time across the vast expanse of the solar system.

LITERATURE REVIEW

1. Orbital Periods and Age Calculation
NASA (2020) explains that each planet has a unique orbital period, meaning they all take different amounts of time to complete one revolution around the Sun. This variation is the basis for figuring out how old someone would be if they lived on another planet. For instance, Earth's year lasts about 365.25 days, while Jupiter's takes nearly 12 Earth years to complete.
NASA. (2020). Planetary fact sheet. Retrieved

2. Kepler's Laws of Planetary Motion
Kepler's Laws, introduced in 1609, describe how planets follow elliptical paths and move at speeds that vary depending on their distance from the Sun. These principles explain the differences in orbital time across planets, which in turn affects how we measure age on them.Kepler, J. (1609). Astronomia Nova. Prague.

3. Educational Value of Planetary Age Calculations
According to Sadler and Tai (2001), using practical concepts like planetary age in classrooms helps make physics more engaging for students. It provides a hands-on way to explore ideas like orbital mechanics and time, making learning more relatable and effective.
Sadler, P. M., & Tai, R. H. (2001). Success in introductory college physics: The role of high school preparation. Science Education, 85(2), 111–136.

4. Psychological Perception of Time
Zimbardo and Boyd (2008) explore how our sense of time is largely shaped by social and environmental influences. By thinking about age in the context of other planets, we can begin to question and expand our Earth-based views of time and aging.
Zimbardo, P. G., & Boyd, J. N. (2008). The time paradox: The new psychology of time that will change your life. Simon and Schuster.

5. Popular Science and Space Awareness
In his book, Tyson (2017) uses the idea of time passing differently on other planets to help readers become more curious about space. He presents this concept as an accessible way to introduce people to deeper scientific ideas and promote interest in astrophysics.
Tyson, N. D. (2017). Astrophysics for people in a hurry. W. W. Norton & Company.

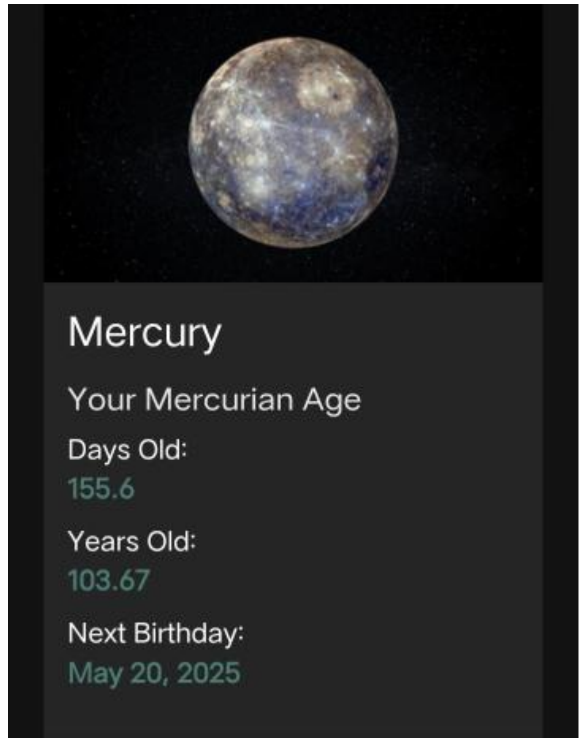
OBJECTIVE

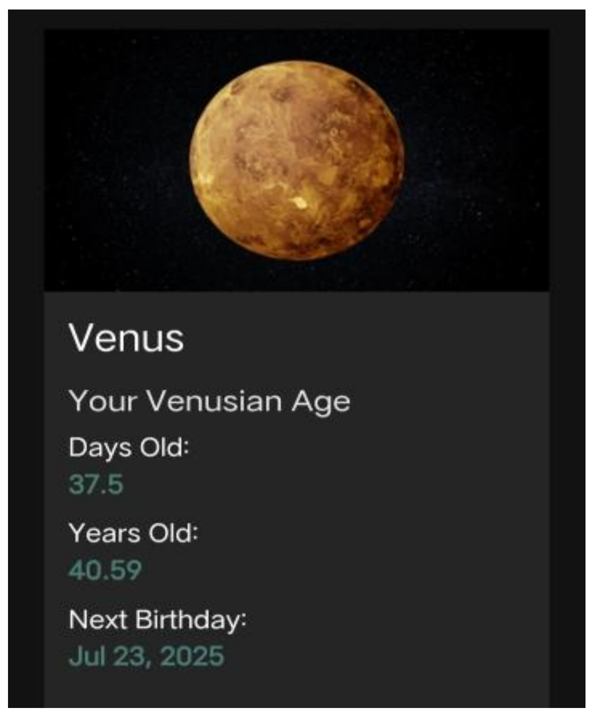
In this Articals aim are -
1. How many Earth year in a one year of Venus or other planets.
2. We can calculate our age in terms of earth days or year compare to other planets not only our age rather then other apieces.

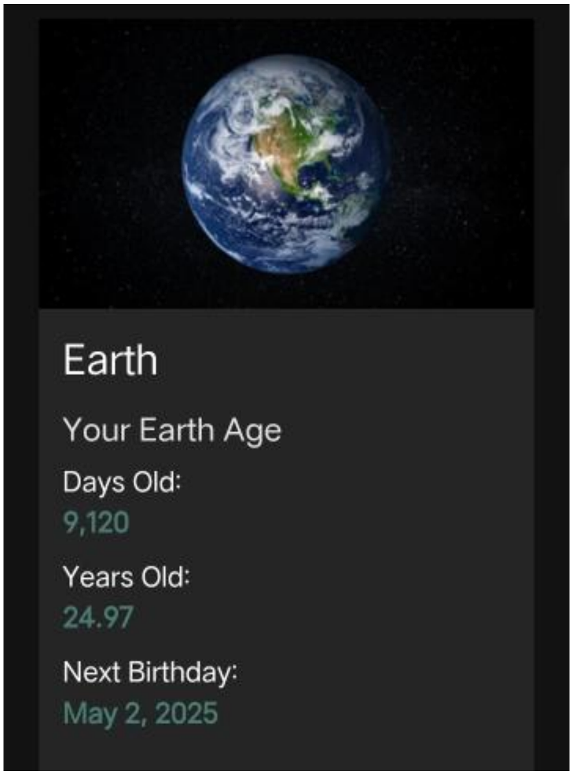
RESEARCH METHODOLOGY

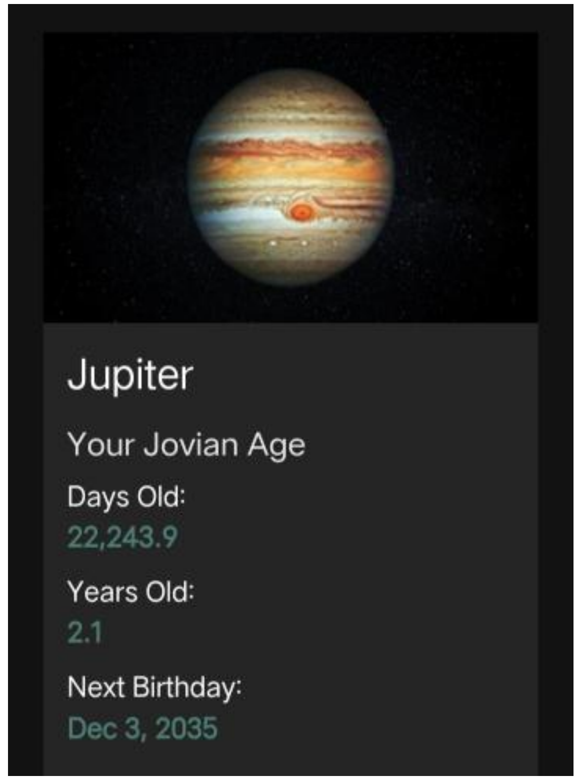
This research paper utilizes a secondary source methodology to examine variations in age calculation across different planets.
The Days (and year) of our Lives:-
We'll immediately Notice that we are different ages on the different planets this brings up the Question of how we measure what is a day? What is year ?

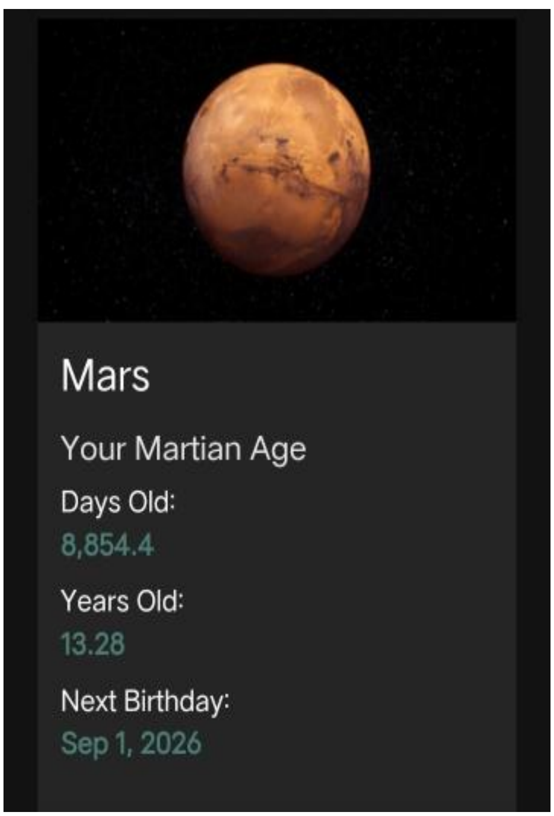
Suppose…A boy Alex whose birth date on earth is 02-05-2000 then his age in days, years and next birthday in different planets is given in detail below



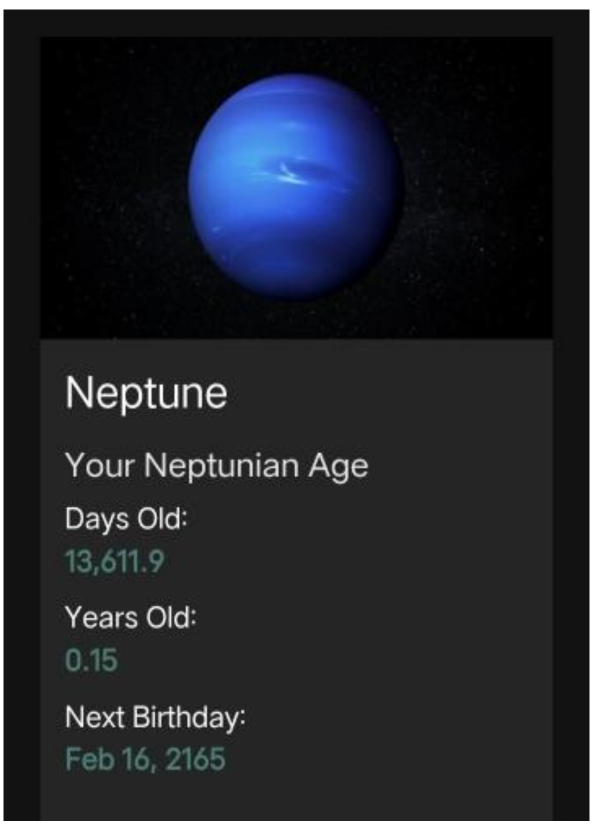


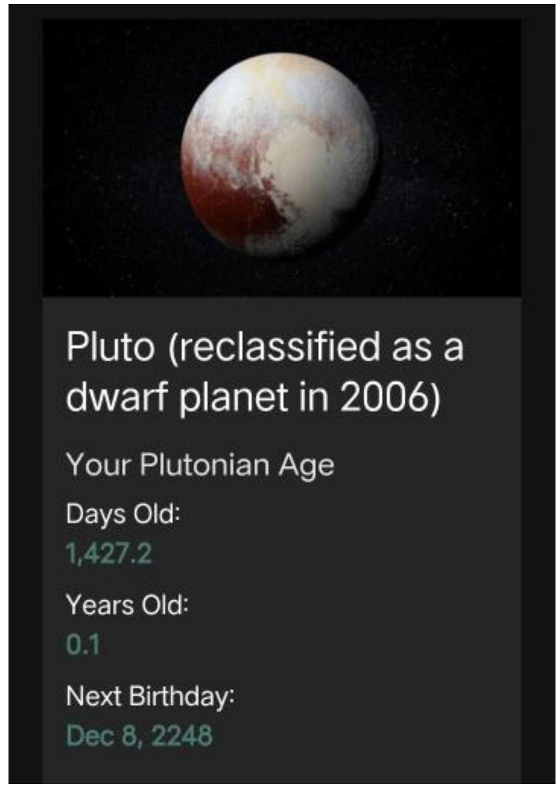

Earth
Your Earth Age
Days Old:
9,120
Years Old:
24.97
Next Birthday:
May 2, 2025


Jupiter
Your Jovian Age
Days Old:
22,243.9
Years Old:
2.1
Next Birthday:
Dec 3, 2035


Mars
Your Martian Age
Days Old:
8,854.4
Years Old:
13.28
Next Birthday:
Sep 1, 2026


Saturn
Your Saturnian Age
Days Old:
20,266.7
Years Old:
0.85
Next Birthday:
Oct 16, 2029





Source:
https://www.exploratorium.edu/explore/solar-system/age?utm_source=perplexity

ANALYSIS

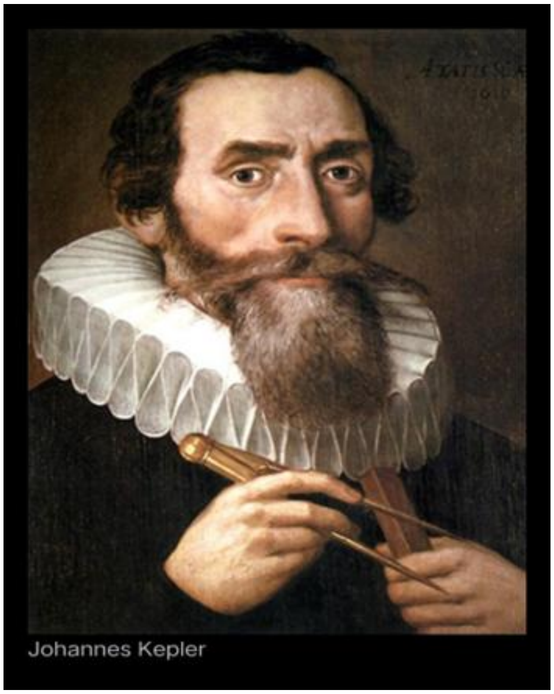
Kepler s law of orbital motion:-
The big differences in the time it takes planets to orbit the Sun—known as their periods—are explained by Johannes Kepler's discoveries in the early 1600s. Before Kepler, most people thought planets moved in perfect circles, but using Tycho Brahe's detailed observations, Kepler found that planets actually move in ellipses, with the Sun at one focus of the ellipse.

Kepler's three laws explain why orbital periods vary so much:

- Planets move in elliptical orbits, not circles, with the Sun at one focus.
- As a planet moves around its orbit, it travels faster when it's closer to the Sun and slower when it's farther away.
- Most importantly for the question, Kepler's third law says that the farther a planet is from the Sun, the longer it takes to complete one orbit. Specifically, the square of a planet's orbital period

is proportional to the cube of its average distance from the Sun. This means even small increases in distance lead to much longer periods.

So, the huge differences in orbital periods are because planets farther from the Sun not only have to travel a longer path, but they also move more slowly along it, as described by Kepler's laws.



Source:- https://www.exploratorium.edu/explore/solar-system/age?utm_source=perplexity

Kepler s Third law of motion :-

Kepler's third law is the one that interests us the most. It states precisely that the period of time a planet takes to go around the sun squared is proportional to the average distance from the sun cubed. Here's the formula:

$$Periods^2 = Distance^3$$

Let's just solve for the period by taking the square root of both sides:

$$Periods = \sqrt{Distance^3}$$

Note that as the distance of the planet from the sun is increased, the period, or time to make one orbit, will get longer. Kepler didn't know the reason for these laws, though he knew it had something to do with the Sun and its influence on the planets. That had to wait 50 years for Isaac Newton to discover the universal law of gravitation.

The gravity of the situation:-

Planets that are closer to the Sun move faster in their orbits, while those farther away move more slowly. This happens because of gravity, which is the force of attraction between two objects. The strength of this force depends on both the mass of the Sun and the mass of the planet. A planet with more mass experiences a stronger pull. However, distance also plays a big role—when a planet is farther from the Sun, the gravitational force becomes much weaker. In fact, the force decreases quickly: doubling the distance reduces the force to one-fourth, tripling it makes it one-ninth, and so on. This is called the inverse square law. In equation form, the gravitational force increases with mass and decreases with the square of the distance between the objects. This explains why closer planets move faster—they feel a stronger pull from the Sun and are swung around more quickly.

Formula for gravitational force:-

$F = G\, mM/d^2$

Where:-

F= Force
G= Gravitational constant
M= mass of sun
m= mass of plant
d= Distance between them

Date Table:-

Planets name	Rotation rates	Revolution rates	Orbital periods	Earth year of Alex (age- 25)
Mercury	58.6days	87.97days	0.24 year	10.5 year
Venus	243 days	224.7days	0.62 year	15.5 year
Earth	0.99days	365.26days	1 year	25 year
Mars	1.03days	1.88 year	1.88year	47 year

Jupiter	0.41days	11.86 year	11.86year	296.5 year
Saturn	0.45days	29.46 year	29.46year	736.5 year
Uranus	0.72days	84.01 year	84.01 year	2100.25 year
Neptune	0.67days	164.8 year	164.8 year	4120.00 year
Pluto	6.39days	248.59 year	248.59 year	6214.75 year

Formula:-
Planet Age = Earth age / planets orbital period

Additional:-
We can use c programming coding Which is here below:-

Input:-

```
#include <stdio.h>
// Function to convert Earth age to age on other planets
double convertAge(double earthAge, double orbitalPeriod) {
    return earthAge / orbitalPeriod;
}

int main() {
    double earthAge;

    // Orbital periods in Earth years
    const double mercuryYear = 0.24;
    const double venusYear = 0.62;
    const double marsYear = 1.88;
    const double jupiterYear = 11.86;
    const double saturnYear = 29.46;
    const double uranusYear = 84.01;
    const double neptuneYear = 164.8;
    const double plutoYear = 248.59;

    printf("Enter your age in Earth years: ");
    scanf("%lf", &earthAge);

    printf("\nYour age on different planets:\n");
    printf("Mercury: %.2lf years\n", convertAge(earthAge, mercuryYear));
    printf("Venus: %.2lf years\n", convertAge(earthAge, venusYear));
    printf("Earth: %.2lf years\n", earthAge);
    printf("Mars: %.2lf years\n", convertAge(earthAge, marsYear));
    printf("Jupiter: %.2lf years\n", convertAge(earthAge, jupiterYear));
    printf("Saturn: %.2lf years\n", convertAge(earthAge, saturnYear));
    printf("Uranus: %.2lf years\n", convertAge(earthAge, uranusYear));
    printf("Neptune: %.2lf years\n", convertAge(earthAge, neptuneYear));
    printf("Pluto: %.2lf years\n", convertAge(earthAge, plutoYear));

    return 0;
}
```

Out put :-

```
Enter your age in Earth years: 25
Your age on different planets:
Mercury: 10.5years
Venus: 15.5 years
Earth: 25 years
Mars: 47 years
Jupiter: 296.5years
Saturn: 736.5years
Uranus: 2100.25 years
Neptune: 4120.00years
Pluto: 6214.75 years
```

Applications:-

1. Astronomy Education
Helps in teaching concepts of orbital mechanics, gravity, and time perception.
Engages students in understanding planetary motion.

2. Space Colonization Concepts
Useful for timekeeping on other planets.
Could influence calendar systems for Mars colonies (e.g., the Darian calendar).

3. Science Fiction & Worldbuilding
Writers use planetary time to create immersive worlds (e.g., Martian characters celebrating a "birthday" every 687 Earth days).

4. Philosophical/Conceptual Thinking
Alters perception of age and time, challenging human-centric views of lifespan.
Stimulates discussion about biological age vs. calendar age.

5. Personalization & Fun Tools
Apps and websites let users calculate their planetary age.
Could be used in gamified learning or virtual birthday tracking.

CONCLUSION

Calculating human age on different planets offers a captivating glimpse into the relativity of time and the intricate dance of celestial bodies governed by Kepler's laws. By applying these fundamental principles, we gain a deeper understanding of the unique orbital periods and rotational cycles of planets in our solar system. This exploration not only highlights the complexities of timekeeping in a cosmic context but also underscores the profound impact of celestial mechanics on our perception of time. As we continue to venture further into the solar system and beyond, understanding the nuances of time and age on other planets will become increasingly important. This fascinating intersection of astronomy and timekeeping invites us to ponder our place in the universe and the boundless wonders that await us among the stars.

REFERENCE

Here are some references that support the concepts -
1.Kepler's laws of planetary motion:
- Johannes Kepler's book "Astronomia Nova" (1609)
- NASA's website on Kepler's laws

2. Orbital periods and planetary motion:
- NASA's planetary fact sheets
- Astronomical journals like The Astronomical Journal or Monthly Notices of the Royal Astronomical Society

3. Timekeeping and relativity:
- Albert Einstein's theory of general relativity
- Physics textbooks or online resources like Khan Academy or Physics Classroom

4. Celestial mechanics and planetary science:
- Research articles in journals like Icarus or Planetary and Space Science
- Books on planetary science, such as "Planetary Sciences" by Imke de Pater and Jack J. Lissauer
- Kepler, J. (1609). Astronomia Nova.
- NASA. (n.d.). Kepler's Laws of Planetary Motion. Retrieved from (link unavailable)
- Einstein, A. (1915). Die Grundlage der allgemeinen Relativitätstheorie. Annalen der Physik, 49(7), 769-822.
- de Pater, I., & Lissauer, J. J. (2015). Planetary Sciences. Cambridge University Press.

5. NASA. (2020). Planetary fact sheet. https://nssdc.gsfc.nasa.gov/planetary/factsheet/
Sadler, P. M., & Tai, R. H. (2001). Success in introductory college physics: The role of high school preparation. Science Education, 85(2), 111–136. https://doi.org/10.1002/1098-237X(200103)85:2<111::AID-SCE50>3.0.CO;2-0
6.Tyson, N. D. (2017). Astrophysics for people in a hurry. W. W. Norton & Company.
7.Zimbardo, P. G., & Boyd, J. N. (2008). The time paradox: The new psychology of time that will change your life. Simon and Schuster.
8.Freedman, R. A., & Kaufmann, W. J. (2019). Universe (11th ed.). W. H. Freeman and Company.
9.Web refrence
NASA. (n.d.). What is gravity? NASA Space Place. Retrieved from https://spaceplace.nasa.gov/what-is-gravity
10. Astronomy Education
NASA. (n.d.). Solar system exploration: Planets. NASA.
Retrieved from https://solarsystem.nasa.gov/planets/overview
(Covers planetary data useful for understanding orbital mechanics and time perception.)
11. Space Colonization Concepts
Gangale, T. (1998). The Darian calendar for Mars. Mars Society.
Retrieved from http://www.marssociety.org/home/about/mars-calendar
(Outlines a calendar system proposed for Mars colonization.)
12. Science Fiction & Worldbuilding

Seed, D. (2011). Science fiction: A very short introduction. Oxford University Press.
(Explores how science fiction uses alternate planetary conditions and time systems for worldbuilding.)
13. Philosophical/Conceptual Thinking
Cockell, C. S. (2018). Astrobiology: Understanding life in the universe. Wiley-Blackwell.
(Discusses the implications of space environments on human concepts of time and life.)
14. Personalization & Fun Tools
Exploratorium. (n.d.). Your age on other worlds. Retrieved from https://www.exploratorium.edu/ronh/age/
(Interactive educational tool for calculating age across different planetary systems.)
15.https://www.schoolsobservatory.org/things-to-do/whats-your-age-another-planet?utm_source=perplexity
16. Kepler's Works:
- Kepler, J. (1619). _Harmonices Mundi_ (Harmony of the World).
17. Astronomy and Celestial Mechanics:
- Murray, C. D., & Dermott, S. F. (1999). _Solar System Dynamics_. Cambridge University Press.
- Goldstein, H. (1980). _Classical Mechanics_. Addison-Wesley.
18.Timekeeping and Relativity:
- Einstein, A. (1915). _The Theory of General Relativity_. Annalen der Physik.
- Hawking, S. W. (2005). _A Brief History of Time: From the Big Bang to Black Holes_. Bantam Books.
19. Planetary Exploration:
- NASA: Planetary Fact Sheets (for data on planetary orbits and rotations).
- Various research articles and publications on planetary science and exploration.
20. Popular Science and Cosmology:
- Sagan, C. (1980). _Cosmos_. Random House.
- Tyson, N. D. (2007). _Astrophysics for People in a Hurry_. W.W. Norton & Company
21. For programming (input, output):
-PC Turbo C++