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Knowledge

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EDITORIAL

We are glad for the timely publication of *'Know-Edge',* Technical magazine of the Department of Science and Humanities. The faculty members are interested in innovative topics gaining momentum in recent era. This magazine will give us a vivid view of these subject matters.

We sincerely thank our Chairman (Governing Body), Executive Director, Principal and Coordinator for their valuable advice that motivates us for this publication.

We convey our heartiest thanks to our colleagues for their cooperation and contribution without which successful publication would remain incomplete. We wish for the best achievements of this magazine in coming days.

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MULTIPLICATION WITH STRAIGHT LINES

Mr. Rahul Karak

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"Imagination is more important than knowledge" - Albert Einstein.

In the process of imagination several new techniques has been developed. Some of the techniques saves time, energy, money and those are then replaces the old one. Yet some techniques are interesting and easy to understand but not always time saving. One such technique is multiplying with straight lines. The technique is easy when two or three digit numbers are multiplied but it gets laborious with the number of digit increases. We discuss the technique with an example.

Suppose we are to multiply 21 X 32.

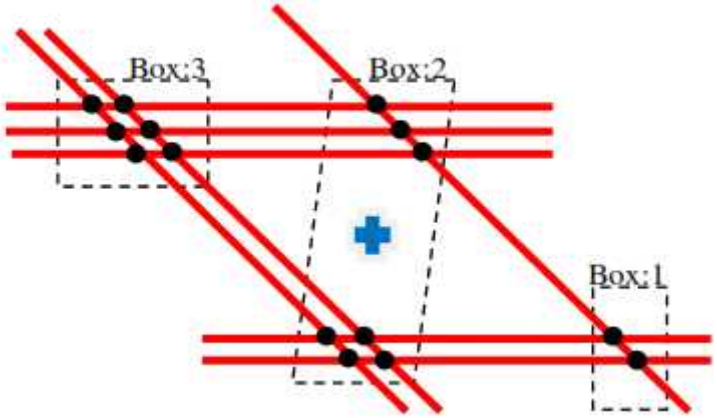
The first digit of the first number is 2. So we draw two parallel straight lines in the following way:

The second digit of the first number is 1 so we draw 1 straight line parallel to the previous set of straight lines leaving a space between the two sets of straight lines in the following way:

The first digit of the second number is 3 and so we draw three parallel straight lines intersecting the previous two set of straight lines in the following:

The second digit of the second number is 2 so we draw two parallel straight lines parallel to last set of straight lines in the following way:

We now considered the intersecting points.



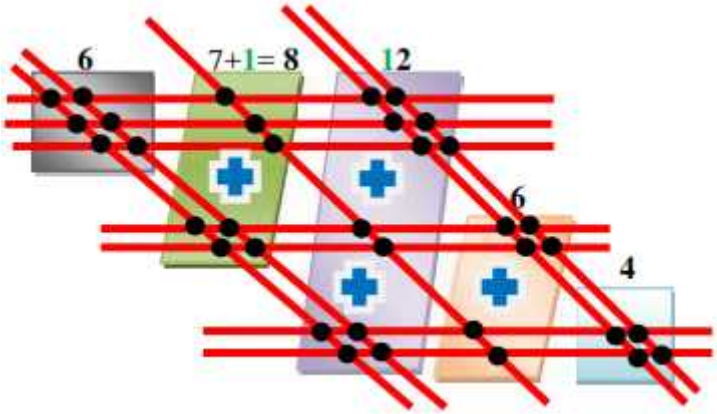
There are two intersecting points in the 1st box, so the digit at the unit place of the resultant is 2. The total number of intersecting points in the 2nd box is 3 + 4 = 7 so the tens place digit is 7. The number of intersecting points in the 3rd box is 6 so the 100 place digit is 6.
Hence the result is 21 X 32 = 672.

<u>The Math Behind the Fact:</u>

The method works because the number of lines are like placeholders (at powers of 10: 1, 10, 100, etc.), and the number of dots at each intersection is a product of the number of lines. You are then summing up all the products that are coefficients of the same power of 10. Thus in the example

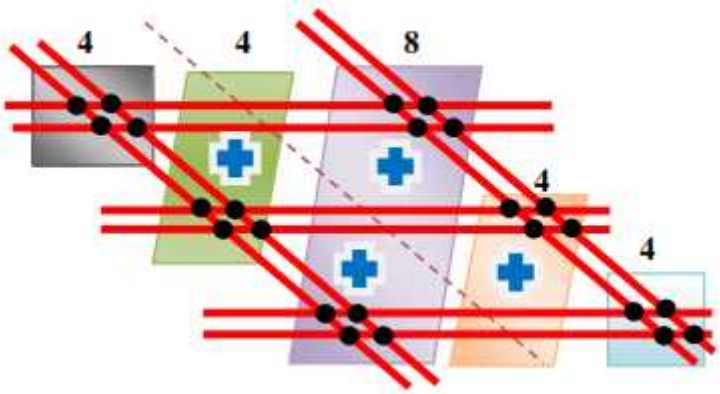
21 X 32 = (2 x10 + 1) x (3 x10 + 2) = 2*3x100 + (1*3 + 2*2) x10 + 1*2 = 672.

<u>Note: (1)</u> In case when the number of intersecting points exceeds 10 then we consider units place digit for that step and tens place digit for next step which is shown in the next example.



Hence 212 X 322 = 68264

Note: (2) In case a number has a zero digit then we draw dotted line corresponding to that zero and should not consider any intersecting points, which is shown in the next example.



Hence 202 X 222 = 44844

Line multiplication is sometimes called stick multiplication, and its origins are unclear, with some source claiming it comes from the Japanese, Chinese or Vedic cultures. It is basically the same process as the standard multiplication algorithm we are taught in school, except it is represented in a more visual way. This method might be helpful for those learners who are more visually-oriented.

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JUNO MISSION TO JUPITER

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Introduction:

The Juno mission is the second mission in NASA's New Frontiers program after the nuclear powered Galileo Orbiter, which orbited from 1995 to 2003. Juno was launched from Cape Canaveral Air Force Station on 5th August 2011 and entered a polar orbit of Jupiter on 5th July, 2016 for a one year prime mission. Juno science goals include the study of Jupiter's origin, interior structure, deep atmosphere, Aurora and magnetosphere. Juno's orbit around Jupiter is a polar elliptical orbit with perijove approximately 5000 km above the visible cloud tops. The payload consists of a set of microwave antennas for deep sounding, magnetometers, gravity radio science, plasma and high energy charged particle detectors, electric and magnetic field radio and a visible camera.

Mission Overview:

Juno completed a five-year cruise to Jupiter, arriving on 5TH July, 2016. The spacecraft travelled a total distance of roughly 2.8 billion kilometres (18.7 astronomical units; 1.74 billion miles) to reach Jupiter. The spacecraft was designed to orbit Jupiter 37 times over the course of its mission. This was originally planned to take 20 months. Juno's trajectory used a gravity assist speed boost from Earth, accomplished by an Earth flyby in October 2013, two years after its launch on August 5, 2011. The Juno spacecraft is unique in several ways. It is the first solar-powered, versus nuclear, spacecraft to perform operations this far from the Sun. To accomplish this, Juno is equipped with three very large solar panels, which when extended; give the spacecraft a diameter of 66 feet. To combat its exposure to radiation during its year orbiting Jupiter, most of Juno's electronics have been housed inside a titanium vault in the centre of the spacecraft. Juno will also be spin-stabilized throughout its mission in order to maximize scientific observations.

***Launch**:*

Juno was launched atop the Atlas V at Cape Canaveral Air Force Station, Florida. The Atlas V (AV-029) used a Russian-designed and -built RD-180 main engine, powered by kerosene and liquid oxygen. At ignition it underwent checkout 3.8 seconds prior to the

ignition of five strap-on solid rocket boosters (SRBs). Following SRB burnout, approximately 1 minute 33 seconds into the flight, two of the spent boosters fell away from the vehicle, followed 1.5 seconds later by the remaining three. When heating levels had dropped below predetermined limits, the payload fairing that protected Juno during launch and transit through the thickest part of the atmosphere separated, about 3 minutes 24 seconds into the flight. The Atlas V main engine cut off 4 minutes 26 seconds after liftoff. Sixteen seconds later, the Centaur second stage ignited and burned for approximately 6 minutes, putting the satellite into an initial parking orbit. The vehicle coasted for approximately 30 minutes, and then the Centaur was re-ignited for a second firing of 9 minutes, placing the spacecraft on an Earth escape trajectory in a heliocentric orbit.

Earth flyby and Insertion into Jupiter's orbit

After travelling for two years in an elliptical heliocentric orbit, Juno returned to pass by Earth in October 2013. It used Earth's gravity to help slingshot itself toward the Jovian system in a makeover called a gravity assist. The spacecraft received a boost in speed of more than 3.9 km/s (8,800 mph) and was set on a course to Jupiter. The flyby was also used as a rehearsal for the Juno science team to test some instruments and practice certain procedures before the arrival at Jupiter. Jupiter's gravity accelerated the approaching spacecraft to around 210,000 km/h (130,000 mph). On July 5, 2016, between 03:18 and 03:53 UTC Earth-received time, an insertion burn lasting 2,102 seconds decelerated Juno by 542 m/s (1,780 ft/s) and changed its trajectory from a hyperbolic flyby to an elliptical, polar orbit with a period of about 53.5 days. The spacecraft successfully entered Jupiter orbit on July 5 at 03:53 UTC.

Jupiter:

The most massive planet in our solar system, with four planet-sized moons and many smaller moons, Jupiter forms a kind of miniature solar system. Jupiter resembles a star in composition. In fact, if it had been about eighty times more massive, it would have become a star rather than a planet. Jupiter’s four largest moons—Io, Europa, Ganymede, and Callisto—were discovered by Galileo in 1610. Io is the most volcanically active body in our solar system. Ganymede is the largest planetary moon and is the only moon in the solar system known to have its own magnetic field. Europa appears to possess a liquid water ocean beneath the frozen crust of Europa, and similar oceans may also lie within Callisto and Ganymede. Astronomers have discovered more than 60 moons orbiting the giant planet. Numerous small, outer moons may be asteroids captured by Jupiter’s gravity. The

composition of Jupiter's atmosphere is similar to that of the Sun—mostly hydrogen and helium. Deep in the atmosphere, pressure and temperature increase, compressing the hydrogen gas into a liquid. At depths about a third of the way down, the liquid hydrogen becomes electrically conducting, like a metal. In this conducting layer, Jupiter's powerful magnetic field is generated by electrical currents driven by Jupiter's fast rotation. At the centre, the immense pressure may support a solid core of ice and rock more than ten times the mass of Earth.

Mission of Juno:

With the exception of the sun, Jupiter is the most dominant object in the solar system. Because of its enormous size and the fact that it was likely the first of the planets to form, it has profoundly influenced the formation and evolution of the other bodies that orbit our star. NASA's Juno mission will allow us to examine this gas giant planet from its innermost core to the outer reaches of its enormous magnetic force field. During its mission, Juno will map Jupiter's gravity and magnetic fields to learn what the planet's interior structure is like. The spacecraft also will observe the composition and circulation of the deep atmosphere and improve our understanding of the forces that control the planet's powerful auroras. In addition to expanding our knowledge of the solar system's largest planet, these investigations will provide clues about what conditions in the early solar system were like when Jupiter was forming. Improving our knowledge of Jupiter's origins and evolution will also help us to better understand the many planetary systems being discovered around other stars.

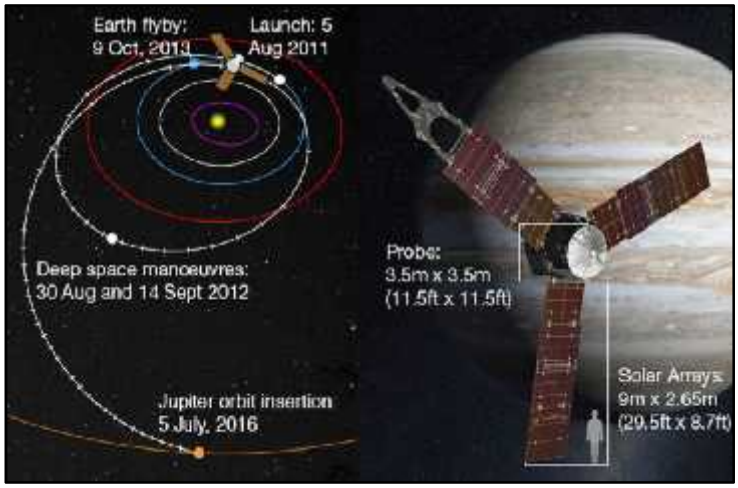

Figure 1: Juno to Jupiter working procedure

The spacecraft completed its first flyby of Jupiter (perijove 1) on August 27, 2016, and captured the first-ever images of the planet's North Pole. On October 14, days prior to perijove 2 and the planned Period Reduction Maneuver, telemetry showed that some of Juno's helium valves were not opening properly. On October 18, 13 hours before its

second close approach to Jupiter, Juno entered into safe mode, an operational mode engaged when its onboard computer encounters unexpected conditions. The spacecraft powered down all non-critical systems and reoriented itself to face the Sun to gather the most power. Due to this, no science operations were conducted during perijove 2. On December 11, the spacecraft completed perijove 3, with all but one instrument operating and returning data. One instrument, JIRAM, was off pending a flight software update. Perijove 4 occurred on February 2, with all instruments operating. Perijove 5 occurred on March 27, 2017. Perijove 6 took place on May 19, 2017. Although the mission's lifetime is limited by radiation exposure, almost this entire dose is acquired during perijove. The current 53.4 day orbit will be maintained through July 2018 for a total of twelve science-gathering perijoves. At the end of this prime mission, the project will go through a science review process by NASA's Planetary Science Division to determine if it will receive funding for an extended mission.

The Juno spacecraft's suite of science instruments will:

- Determine the ratio of oxygen to hydrogen, effectively measuring the abundance of water in Jupiter, which will help distinguish among prevailing theories linking Jupiter's formation to the Solar System.
- Obtain a better estimate of Jupiter's core mass, which will also help distinguish among prevailing theories linking Jupiter's formation to the Solar System.
- Precisely map Jupiter's gravitational field to assess the distribution of mass in Jupiter's interior, including properties of its structure and dynamics.
- Precisely map Jupiter's magnetic field to assess the origin and structure of the field and how deep in Jupiter the magnetic field is created. This experiment will also help scientists understand the fundamental physics of dynamo theory.
- Map the variation in atmospheric composition, temperature, structure, cloud opacity and dynamics to pressures far greater than 100 bars (10 MPa; 1,450 psi) at all latitudes.
- Characterize and explore the three-dimensional structure of Jupiter's polar magnetosphere and auroras.
- Measure the orbital frame-dragging, known also as Lense–Thirring precession caused by the angular momentum of Jupiter, and possibly a new test of general relativity effects connected with the Jovian rotation.

Planned de-orbit and disintegration

Juno is scheduled to reach the end of the mission during its 37th orbit and perform a controlled de-orbit and disintegrate into Jupiter's atmosphere. During the mission, the

spacecraft will be exposed to high levels of radiation from Jupiter's magnetosphere, which may cause future failure of certain instruments and risk collision with Jupiter's moons. The controlled de-orbit will eliminate space debris and risks of contamination in accordance with NASA's Planetary Protection Guidelines. The procedure will take 5.5 days, during which the spacecraft will end communications and descend into Jupiter's atmosphere. Because of the high velocity collision of the spacecraft and the dense atmosphere, Juno will burn up and disintegrate.

Team

Scott Bolton of the Southwest Research Institute in San Antonio, Texas is the principal investigator and is responsible for all aspects of the mission. The Jet Propulsion Laboratory in California manages the mission and the Lockheed Martin Corporation was responsible for the spacecraft development and construction. The mission is being carried out with the participation of several institutional partners. Co-investigators include Toby Owen of the University of Hawaii, Andrew Ingersoll of California Institute of Technology, Frances Bagenal of the University of Colorado at Boulder, and Candy Hansen of the Planetary Science Institute. Jack Connerney of the Goddard Space Flight Centre served as instrument lead.

Cost

Juno was originally proposed at a cost of approximately US$700 million (fiscal year 2003) for a launch in June 2009. NASA budgetary restrictions resulted in postponement until August 2011, and a launch on board an Atlas V rocket in the 551 configuration. As of June 2011, the mission was projected to cost US$1.1 billion over its life.

Timeline

Date	Event
August 2011	Launched
August 2012 to September 2012	Trajectory corrections
October 2013	Earth flyby for speed boost (from 126,000 to 150,000 km/h) (78,000 to 93,000 mph)
July 5, 2016, 02:50	Arrival at Jupiter and polar orbit insertion (1st orbit)
October 19, 2016	Planned Period Reduction Maneuver, but main engine did not operate as expected
September 1, 2017	Earliest expected JunoCam failure
2018–2019	Spacecraft disposal in the form of a controlled de-orbit into Jupiter.

Summary:

The challenges on Juno were numerous, with many similar to other NASA missions. The special challenges for Juno included the radiation, solar power, power, mass, and the shear number of instruments. The management of our limited resources required careful and constant monitoring. Issues throughout development had to be dealt with efficiently in order to stay within the cost cap. Juno's novel approach to conceptual design (synergy between science, engineering, and mission design) was key to our successful implementation. The inherent efficiency gained by this conceptual approach provided the basis for a flagship style outer planet orbiter at a New Frontiers program cost level. Continuation of this synergistic approach during implementation forced constant and effective communication across the project's engineers and scientists. Discussion and decision meetings both routinely occurred within this synergy framework, including our weekly meetings. Everyone was on ONE team.

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TIME TRAVEL

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Abstract: Time travel is a recognized concept in philosophy and fiction, defines as movement between different points of time as space. However this theory is mathematically proved but technically it is impossible to travel in time. However, only one way time travel is only possible. One way to achieve time travel into the future would be travelling at the speed of light in space, as first theorised by Albert Einstein. There are many paradoxes in physics which explain why backward time travel is not possible. We discuss them in later.

Introduction: Time is one of the great mysteries of the universe. We are all swept up in the river of time against our will. All of us have at some time wondered about the strange nature of time and how it differs from space. If we can move forward and backward in space, why not time? From the perspective of science, time travel was impossible in Newton's universe, where time was seen as an arrow. Once fired, it could never deviate from its past One second on the Earth was one second throughout the universe. This conception was overthrown by Einstein, who showed that time was more like a river that meandered across the universe, speeding up and slowing down as it snaked across stars and galaxies. So one second on the Earth is not absolute; time varies when we move around the universe. According to Einstein's special theory of relativity, time slows down inside a rocket the faster it moves. But the speed of light is the ultimate barrier for any rocket.

History of the time travel concept:

Some ancient myths depict a character skipping forward in time.

1. In Hindu mythology, the ***Mahabharata*** mentions the story of King Raivata Kakudmi, who travels to heaven to meet the creator Brahma and is surprised to learn when he returns to Earth that many ages have passed.
2. The Buddhist Pāli Canon mentions the relativity of time. The Payasi Sutta tells of one of the Buddha's chief disciples, Kumara Kassapa, who explains to the skeptic Payasi that,

"In the Heaven of the Thirty Three Devas, time passes at a different pace, and people live much longer. "In the period of our century; one hundred years, only a single day; twenty four hours would have passed for them.

3. The Japanese tale of "Urashima Taro", first described in the Nihongi (720) tells of a young fisherman named Urashima Taro who visits an undersea palace. After three days, he returns home to his village and finds himself 300 years in the future, where he has been forgotten, his house is in ruins, and his family has died.
4. In 1836 Alexander Veltman published *Predki Kalimerosa: Aleksandr Filippovich Makedonskii* (The Forebears of Kalimeros: Alexander, son of Philip of Macedon), which has been called the first original Russian science fiction novel and the first novel to use time travel. The narrator rides to ancient Greece on a hippogriff, meets Aristotle, and goes on a voyage with Alexander the Great before returning to the 19th century.
5. Charles Dickens's *A Christmas Carol* (1843) has early depictions of time travel in both directions, as the protagonist, Ebenezer Scrooge, is transported to Christmases past and future. Other stories employ the same template, where a character naturally goes to sleep, and upon waking up finds itself in a different time.
6. Edward Everett Hale's "Hands Off" (1881) tells the story of an unnamed being, possibly the soul of a person who has recently died, who interferes with ancient Egyptian history by preventing Joseph's enslavement. This may have been the first story to feature an alternate history created as a result of time travel.

Ways to travel through time: Now it's generally accepted that time travel is a one way trip, only going forward, and there may be some truth to that, but that's not guaranteed and it would be fun to imagine travelling at a faster rate to investigate the future, or even going against the flow of time to investigate the past, which leads onto our next method of time travel. As with a river, the current flows at different speeds in different places. Science as we know it allows for several methods to take the fast-track into the future or past.

1. Speed - Einstein showed time was flexible and could be affected by speed, with his Theory of Relativity showing that as you approach the speed of light (186,282 miles per second) time slows down. Astronauts on board the International Space Station travelling at 17,000 miles per hour, for instance, age 0.014 seconds less than earthbound humans every year. Relativistic time travel even rears its head for the constellation of GPS satellites. If it

wasn't for automatic corrections built into the system, geo location would be inaccurate by as much as 6 miles (10 km) a day.

If you were in a spaceship travelling at 90% of the speed of light, you'd experience time passing about 2.6 times slower than it was back on Earth. And the closer you get to the speed of light, the more extreme the time-travel. The highest speeds achieved through any human technology are probably the protons whizzing around the Large Hadron Collider at 99.9999991% of the speed of light.

2. Gravity- The next method is also inspired by Einstein. According to his theory of general relativity, the stronger the gravity you feel, the slower time moves. As you get closer to the centre of the Earth, for example, the strength of gravity increases. Time runs slower for your feet than your head.

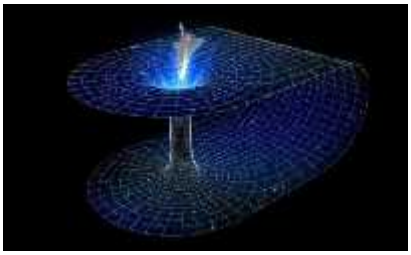
Again, this effect has been measured. In 2010, physicists at the US National Institute of Standards and Technology (NIST) placed two atomic clocks on shelves, one 33 centimetres above the other, and measured the difference in their rate of ticking. The lower one ticked slower because it feels a slightly stronger gravity.

To travel to the far future, all we need is a region of extremely strong gravity, such as a black hole. The closer you get to the event horizon, the slower time moves – but it's risky business, cross the boundary and you can never escape. And anyway, the effect is not that strong so it's probably not worth the trip. Assuming you had the technology to travel the vast distances to reach a black hole (the nearest is about 3,000 light years away), the time dilation through travelling would be far greater than any time dilation through orbiting the black hole itself.

Therefore, while black holes will simply crush anything that enters them, by staying outside of its event horizon you could travel years into the future relative to an observer beyond its gravitational field, while for you just a few days would have elapsed.

3. Wormholes - A wormhole is a hypothetical passage in space-time connecting two separate points, thus giving the traveler the chance to traverse potentially astronomical distances instantaneously. Furthermore, general relativity predicts that if traversable

wormholes do spontaneously exist, they could permit time travel through relativistic time dilation. However, there is no way to predict where the other end of them would be. Worse yet, theories seem to indicate it would be a one-use sort of thing, collapsing behind you as you pass through it. If it went anywhere, that would be the end of the journey – there would be no hope of return, and no way for someone to follow. We don't currently possess or understand a method for generating a wormhole, but current estimates suggest that we would need the output of an entire sun to create one. With only one Sun in our solar system, which happens to be in use of the moment.



4. Cosmic strings- Described as one-dimensional "cracks in the universe" and some of the strangest structures observed by cosmologists, cosmic strings could help us navigate through time. "Cosmic strings are either infinite or they're in loops, with no ends", explains J Richard Gott, an astrophysicist at Princeton University. "So they are either like spaghetti or Spaghetti Os." They are thought to have formed billions of years ago, moments after the Big Bang, and because they contain such large amounts of mass, some scientists believe they could potentially "warp" space-time around them. "The approach of two such strings parallel to each other, will bend space-time so vigorously and in such a particular configuration that, it might make time travel possible.

Conclusion: Apart from physical problems, several paradoxes stand in the way of time travel. These include the "grandparent paradox", which has long flumoxed physicists and philosophers. As Science Alert explains, a time traveller could in theory prevent his or her grandparents from meeting, "thus preventing the time traveller's birth". This would make it impossible for the time traveller to have set out in the first place and kept the grandparents apart. However, cosmologists believe they have figured a way around this by suggesting that there is more than one universe in existence – the 'multiverse' model. This allows for every possible version of an event to take place. This, and other paradoxes, are situations that "give cosmologists nightmares,"

Research is still going on. May be in the next century we are able to meet our ancestors or probably successors. But beside all this things I would like to say that we all have a time machine with us, which is in our brain and often lead us to our memories of past. Then what about the future? Well why we should think about the future which is uncertain. There will be no time machine ever be possible to make, which will allow you to change your future ,except your will power.

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THE ULTIMATE RUIN OF THE SUN

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Introduction

The sun is the source of all energies we know in one word. The sun is also friend, philosopher and guide of all the planets, sub-planets, comets in the solar system. This burning gaseous sphere is a yellow colored G2 type star. After different researchers over sun for few decades we have come to know about the incidents occurred inside the sun. The reason behind the enormous weight of the sun is the strong centrifugal force in the inner core due to gravitation. Scientists have calculated that this tremendous pressure is 34,000 crore times that of the pressure on the sea level.

Composition of the sun: The diameter of sun is about 109 times that of earth and its mass is 3,30,000 times that of the earth accounting about 99.86% of the total mass of the solar system. Almost 73% of the sun's mass consists of hydrogen and rest is mostly helium (≈ 25%). There are also oxygen, carbon, neon and iron to small percentages. The temperature of nature increases with increase of pressure, similarly the temperature of the sun also increases with pressure. The temperature at the inner core of the sun is (1.5 - 1.6) crore ˚C. Atoms do not exist at that high temperature. The electrons from outermost shells of hydrogen atoms exit and create protons. Now $\sqrt{p} \propto \sqrt{T}$. If temperature increases 100 times then velocity increases 10 times. In such a condition there creates haphazardness among the hydrogen ions and the nucleuses are merged to form helium atom from 4 hydrogen atoms. This small amount of mass is converted to energy according to the equation $E= mc^2$.

Source of energy inside the sun: The energy originated at the centre of the sun forcedly drives out the matters present inside the inner core of the sun. On the other hand the centrifugal force due to gravity of the sun also helps to bind those matters inside the sun. These two opposite forces help to maintain the size and volume of the sun. Due to continuous fusion reaction inside the sun the hydrogen fuel present in its core is gradually exhausted. The age of the sun is now 500 crore years. There is also hydrogen fuel inside the sun for more 500 years. Almost 70 crore ton hydrogen fuel is converted to 69.5 crore ton Helium fuel per second inside the sun. Actually there does not occur any combustion reaction in presence of oxygen inside the sun. But the nuclei of the atoms when bound together due to high pressure

and temperature there produce energy directly from matters. With the increase of the age of the sun the fuel inside the sun will be completely exhausted and as a result the process of direct energy production will be stopped. The energy produced at the inner core of the sun reaches at its surface after 1000000 years.

Then it reaches at the solar system and on the earth. So if we want to observe the changes inside the sun at the last moment we will have to wait for 1000000 years. After that due to heavy weighted the atoms will be attracted towards the nucleus and those will acquire the places of hydrogen atoms. But there will still remain a lot of hydrogen atoms inside the layers between the inner core and outer surface of the sun. Later due to increase of pressure and temperature the hydrogen rich thin layer will participate in reaction and as a result the size of the sun will be increased again. But we will not be able to observe those from such a long distance. Due to contraction in the inner core and extension in the outer surface, the pressure and temperature of the inner core will be increased to very high extent. The burning hydrogen layer will cover the inner parts. There will occur no nuclear reaction at the time in the inner core. When temperature will be almost 10 crore ^{o}C then like hydrogen atoms helium atoms in the inner core will rush towards each other, merge with each other after collision. The helium atoms will be converted to carbon and oxygen atoms and the abolished mass will be converted to energy. For the first time helium will be used as fuel inside the sun.

Red giant: when He present at the inner core of the sun starts to burn, the hydrogen present in the different layers of sun will also start to burn. Due to production of large amount of energy the figure of the sun will become very large. If a star expands to so large extent, its pressure, density and temperature decreases due to expansion. So the white hotted sun having temperature 6000 ^{o}C will lose its temperature to 3000 ^{o}C. This large size star will radiate the rays like red hotted iron. This star having comparatively low temperature and large size is then rightly called red giant. The sun will take more 500 crore years to convert into such a red giant. The fuels used inside red giant are hydrogen and helium and those can produce carbon and oxygen. After converted into red giant it will destroy first 3 planets in the solar system. The gaseous matters inside Jupiter and Saturn will be vaporized due to force of gravitation into the space. The hydrogen and helium present inside the sun are used as fuel to produce carbon and oxygen.

The fuels used inside the sun: In the first stage of thermo nuclear reactions hydrogen is used as fuel and helium gathers as ash. In the second stage helium is used as fuel and carbon and

oxygen as ash particles. The carbon and oxygen will be gathered at the center of the sun. Due to continuous exhaust of fuel inside the sun, the gravitational force will be increased and its center will be contracted. In that condition there will create three different regions inside the sun – 1) carbon and oxygen rich central part, 2) He rich middle region and 3) hydrogen rich outermost region. Due to contraction of the sun the temperature at the carbon and oxygen rich center and outside the helium rich region will be increased and it will start to burn. The ash particles produced due to exhaustion of helium layer will remain inside the helium layer and ash particles of helium layer will occupy the oxygen and carbon rich central part. The burning helium and hydrogen surroundings the central part of the sun will be expanded gradually. At a time the helium and hydrogen will be completely exhausted and it will contract the body of the sun. But due to absence of much more particles inside the sun it will not create nucleus of heavy elements by thermonuclear reactions. Due to expansion of the sun its inner part will become cold and the rate of thermonuclear reaction will be decreased. As a result the sun will be contracted. Due to this fact the rate of thermonuclear reaction will be increased further and it will increase the volume of the sun. Due to this continuous thermal vibrations there will occur explosion and the central part of the sun will become separated from the outside of the sun. The outer part of the sun will be scattered in the space. The part of the sun will become cold by emission of UV- sunlight in the space. When the ultraviolet light emitted from the dead sun will be fallen on the scattered particles of the sun this will create a very beautiful universal site. The ultimate allotrope of the sun will be a white dwarf covered with a planetary nebula. The sun will remain in the rest in peace as this planetary nebula.

The energy generation process inside the sun will be stopped after explosion of the sun due to lack of fuel inside it. Now due to strong force of gravitation the particles inside the sun will be gathered to such extent that the atoms will be broken easily. Now the electrons rotate around atoms due to electrostatic force of attraction. Due to strong gravitational force of attraction the nucleus of the atoms will be combined together and there will create large electron ocean. Due to gathering of so much large number of electrons, there will produce a strong force of repulsion inside the sun and it will hinder the tendency of contraction of the sun. Due to gathering of the electrons, it will create an opposing force inside the sun against the gravitational force. This is called degenerate electron pressure.

White Dwarf: The gaseous layer outside the sun will be removed gradually and then the temperature of the Sun will be decreased from 100000 ^{o}C to (40000 – 50000) ^{o}C. This small dead sun will emit white light from its outer surface and so it will look like white dwarf.

The ultimate allotrope of all the starts like the sun is white dwarf, which are nothing but the dead stars. There are so many stars who were converted to white dwarf.

Black Dwarf: The white dwarf will radiate its light and energy for a uncountable long period of time. After that it will be converted it to black dwarf. Then it will be difficult to identify the sun for a spectator who is observing it from the earth.

Conclusion: So before the occurrence of the rare incidents in the universe the most brilliant human being will have to discover another earth like planet, where he will shift permanently with their necessary things to create a new history of life.`

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CELLULOSE APPLICATIONS IN PHARMACY

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Abstract: Plant produces several metabolites using raw materials formed during the primary metabolic pathways in response to needs and challenges of its environment. These secondary all compounds are alkaloids (20), flavonoids (15), triterpenes and simple phenolics (about 10) and others are present in traces, in limonoid being the least. These have very wide applications in the area of pharmacy, food activities, fragrances, pesticides etc.

Keywords: cellulose, pharmaceuticals, gelling agent, mucoadhesives.

Application in pharmaceutical coating process

Nature has been carrying 10000 chemical molecules in each plant .Pharmaceutical solid dosage forms such as tablets, pellets, pills, beads, spherules, granules and microcapsules are often coated for different reasons in order to provide protection of sensitive drugs from humidity, oxygen and all of inappropriate and environmental conditions, protection against acidic or enzymatic degradation of drugs, odor or taste masking or making site or time specific release in pharmaceuticals to prepare various modified release drug delivery systems such as sustained release, delayed release, extended release, immediate release, palsatile release or step-by-step release dosage forms. But Ether and ester derivatives of cellulose are widely used as coating of solid pharmaceuticals. Cellulose ethers are generally hydrophilic and convert to hydro gel after exposing to water. Although, some of the cellulose ethers example ethyl cellulose are insoluble in water but majority of them such as methyl, hydoxypropyl Hydroxypropylmethyl cellulose our water soluble. Both of soluble and insoluble cellulose ethers can absorb water and form a gel. After exposing of these coated dosage forms with water, the coating polymers form to hyrogel and gradually dissolve in water until disappear but the insoluble cellulose ether coatings remain as a viscose gel around tablets and drug release is performed by diffusion of drug molecules within this layer. These two types of dosage forms called dissolution-controlled and diffusion-controlled drug delivery systems, respectively.

Application as gelling agents

Gels are semisolid systems consisting of dispersions of very small particles or large molecules in an aqueous liquid vehicle rendered jellylike by the addition of a gelling agent. In recent decades, synthetic and semi-synthetic macromolecules include: carbomers, cellulose

derivatives and natural gums as gelling agents in pharmaceutical dosage forms. Cellulose derivatives such as HPMC and CMC are the most popular gelling agents used in drug formulations as they are less sensitive for microbial contamination than natural gelling agents such as tragacanth, acacia, sodium algininate, agar, pectin and gelatin. Cellulose derivatives generally dissolve better in hot water (except MC grades) and their mechanisms of jellification is thermal. For preparing gel, powder of these polymers with suitable amount initially dispersed in cold water by using mechanical mixture and then, the dispersion is heated to about 60-80°C and gradually cooled to normal room temperature to form a gel (except MC grades). The resulted gels from these polymers are single-phase gels. Adding of electrolytes in the low concentrations increase the viscosity of these gels by salting out mechanism and higher concentrations (above 3-4%) can precipitate the polymer and breakup the gel system. Maximum stability and transparency of the gels prepared by these polymers is about neutral range (pH= 7-9) and acidic pHs can precipitate them from gel system. Minimum gel-forming concentrations of cellulose derivatives are different based on the type and the molecular weights of them but the medium range is about 4-6%w/v. The type of cellulose derivative in pharmaceutical gels can significantly affect drug release from gel formulations. These gels also can be used as the base of novel drug delivery systems such as liposomal formulations.

Application in bio adhesive and mucoadhesive drug delivery systems

Bio adhesives and mucoadhesives are drug containing polymeric films are able to adhere to biological membranes after combining with moisture or mucus compounds. Bio adhesives were developed in mid 1980s as a new idea in drug delivery and nowadays they have been accepted as promising strategies to prolong the residence time and to improve specific localization of drug delivery systems on various biological membranes. Their dosage forms as compared to conventional tablets have higher patient compliance due to their small size and thickness. Other advantage of these drug delivery systems is their potential to prolong residence time at the site of drug absorption and thus they can reduce the dosing frequency in controlled release drug formulations. These dosage forms can also intensify the contact of their drug contents with underlying mucosal barrier and improve the epithelial transport of drugs across mucus membranes especially in the case if poorly absorbed drugs. Some special polymers can be used in these formulations with epithelial permeability modulation ability by loosening the tight intercellular junctions. Some of these polymers also can act as proteolytic enzymes inhibitor in orally used adhesive formulations of sensitive drugs.

Bioadhesives considered as novel drug delivery systems. These dosage forms are formulated to use on the skin and mucus membranes of gastrointestinal, ear, nose, eye & rectum. The main excipients of these formulations are adhesive and film-former polymer(s). Adhesive polymers are synthetic, semi synthetic or natural macromolecules with capability of attaching to skin or mucosal surfaces. Very different types of polymers have been used as bioadhesive polymers. Synthetic polymers such as acrylic derivatives, carbopols and polycarbophil, natural polymers such as carrageen, pectin, acacia and alginates and semi-synthetic polymers like chitosan and cellulose derivatives are used in bioadhesive formulations. Cellulose derivatives especially cellulose ethers are widely used in bioadhesives. There are used in various types of these formulations such as buccal, ocular, nasal and transdermal formulations alone or with combination of other polymers. More recently used cellulose ethers in bioadhesives include nonionic cellulose ethers such as ethyl cellulose (EC), hydroxyethyl cellulose, hydoxypropyl cellulose (HPC), methyl cellulose (MC), carboxymethyl cellulose (CMC) or hydroxylpropylmethyl cellulose (HPMC) and anionic ether derivatives like sodium carboxymethyl cellulose (NaCMC).

CONCLUSION

Cellulose derivatives are extensively used for thickening of pharmaceutical solutions and disperse systems such as emulsions and suspensions. These polymers increases viscosity of non-aqueous pharmaceutical solution likes organic-based coating solutions. In some cases, viscocity enhancement can increase absorption of some poorly-absorb drugs like insulin from oral dosage forms. Cellulose ethers in concentrations lower than minimum gel-forming amounts are used as thickening agents or viscosity builder. These help in stabilization of pharmaceutical disperse systems especially in suspensions and coarse emulsions. Among cellulose derivatives, cellulose ethers especially their higher molecular weight grades are more suitable for using as viscosity enhancer and stabilizer for liquid pharmaceutical disperse systems such as suspensions and emulsions. There is a direct proportionality between viscosity of cellulose ether solutions and molecular weights of them.

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TRAVELLING IS A PART OF EDUCATION

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Travelling means going from one's place to another or from one's country to another. This instinct of roaming about is rooted in man's nature. This instinct leads a man to see the unseen, to know the unknown and to unveil the mystery.

Travelling is immensely beneficial. Nowadays, it is also regarded as a part of education. "Home keeping youth have ever homely wits". It means who passes his life in one's place and never leaves his place to visit other places, has a too narrow outlook. Travelling widens our view. Besides, it gives us pleasure. It is the almost strong way to get rid of a monotonous life. Furthermore, travelling fosters understanding nations. It is an important component in establishing world peace. Travelling has a great educational value. Travelling and education both associated with each other. Travelling is an essential part of education. It increases our knowledge and widens our intellect. During travelling, a traveller visits different places and comes in to talk with public in different regions, their traditions, cultures and ways of life. Often, travel opens our eyes, not just to the world on the surface, but to the human world, the lives and experiences of our brothers and sisters on different parts of the planet. Sometimes an opportunity presents itself that awakes our passion, or shows us a place where one could be of service and make a real difference in the world. Sometimes, it's a moment that alters the course of our whole life, sometimes it's a simple opportunity to sow into the life of others as a free gift to the universe.

Sometimes, travel shows us who we are in the context of the whole world in a way that simultaneously brings us to our knees and inspires us to get up and do something. Sometimes, through travel, our life's work and passion presents itself; sooner rather than later if we're lucky!

If the purpose of education is to prepare a person for the real world, why is our educational system set up to insulate us from it? It is in the real world that we discover our true selves. Is it possible to call an education complete that has not included a stint "in the real world?" Can we limit our "real world" experience to only one culture, one country, one "reality?"

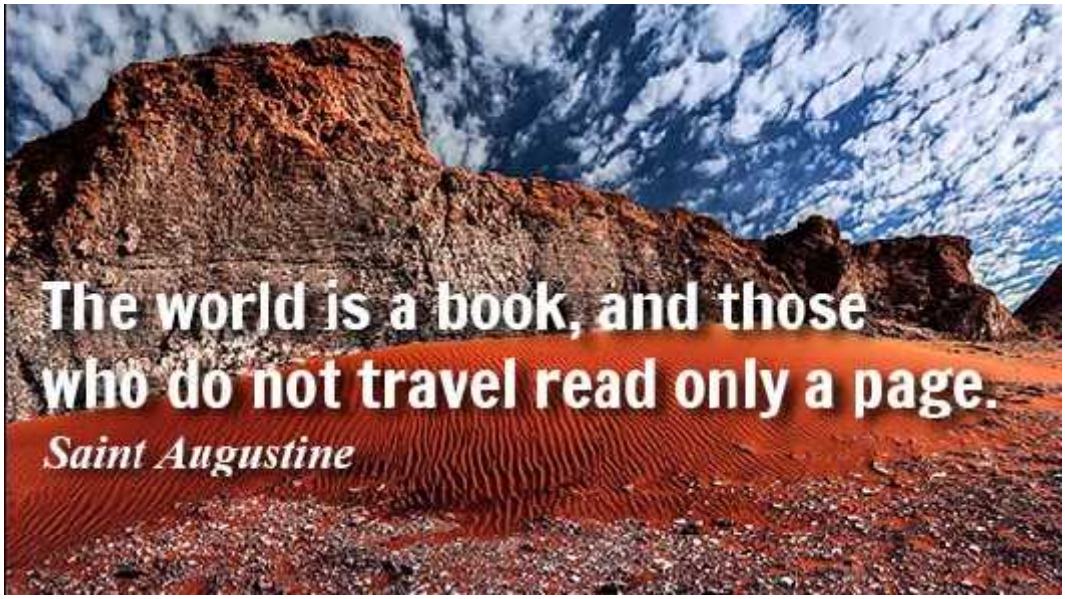
If what we're seeking is actually education, and not simply "schooling," then we can't leave out the experience of swimming in the big dirty pool of humanity that is the "rest of the world." Schooling might happen between four walls, in one culture, in one location, but

education is on going from birth to death, and is constantly occurring with every breath both as individuals and collectively, as the human race. We're all learning together.

Travelling remove this gap because true education takes place outside the classroom. Bookish knowledge made to perfect and significant by travelling.

That is why educational institution often arranges tours for students. Everybody generally taken to the places of historical importance, World Heritage sites, river projects, power stations, hilly regions, etc. Thus, travelling as well as tours widen their outlook and help them do well in the examination. Travelling is to gather experience, and wisdom comes from experience. We have read the majesty of the Himalayas, the vastness of the ocean and the beauty of the Taj Mahal from books. But we know much more of them if we see those with our own eyes. It impresses our mind with the vastness, grandeur, majesty and wonder of God's creation. Travelling helps the traveller to know how the wonderful earth is full of natural beauty. In a word, educations, in the true sense of the term, do the complete and perfect by travelling. In fine, it said that travelling removes boredom and essentially has a great educational value.

So, educational institutions of our country should give greater facilities to their students to undertake tours to various places of importance at home and abroad. Thus, travelling, a good training for success in the struggle of life should be made an essential part of our education.



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DEMONETISATION & INDIAN ECONOMY

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Introduction

On the 8th of November, 2016 when the sun had descended below the horizon and the light of day had completely faded, when people were returning back home from a long day at work, a misty light of a new economy was brewing over the country. All Rs. 500 and Rs. 1000 banknotes of the old series ceased to be legal tender in India from 9thNovember 2016. The government claimed that the demonetisation was an effort to stop counterfeiting of the current banknotes allegedly used for funding terrorism, as well as a crackdown on black money in the country. The move was described as an effort to reduce corruption, the use of drugs, and smuggling. However, in the days following the demonetisation, banks and ATMs across the country faced severe cash shortages. Also, following Prime Minister's announcement, the BSE SENSEX and NIFTY 50 stock indices crashed for the next two days. The term demonetisation has become much more than a household name since the old Rs 500 and Rs 1,000 notes were pulled out of circulation. While as per dictionary demonetisation means "ending something that is no longer the legal tender of a country", one needs to understand that there is much more than the literal meaning to the word. Since our economy is an under banked economy, present demonetisation move, would no doubt cause a severe social experiment, across the segment of our population. At the first place, and on a short term basis this move would benefit the Government, which shall effectively deploy its resources to percolate the impact to the poor and needy of our country. This study report analyse various aspects of the demonetisation and the way forward. The reasons offered for demonetisation are two-fold: one, to control counterfeit notes that could be contributing to terrorism, in other words a national security concern and second, to undermine or eliminate the “black economy”.

Meaning

The dictionary meaning of DEMONETIZE is “To deprive (a metal) of its capacity as a monetary standard” or “To withdraw from use as currency” So, demonetization is the act of stripping a currency unit of its status as legal tender. It is the act or process of removing the legal status of currency unit. A currency on which Governor of RBI on behalf of Central Government guarantees by making statement “I promises to pay the bearer, the sum of money …” which empowers it a legal status. From the date of demonetization, all old currencies which are demonetized will cease to be a legal tender. Such currency cannot be used as money to do any transaction henceforth, but to replace with a new currency.

Reasons of Demonetization

• To promote a Cashless economy

• To eradicate counterfeit currency

• Eliminate black money

• To combat corruption

• To combat inflation

• Crackdown on terrorism and Naxalism

Effect of Denomination of Currency Notes on Some Sectors

Here are a few sectors that would be heavily impacted by the recent ban on Rs 500 and Rs 1,000 currency notes in India:

a) E-commerce start-ups

Majority of tech savvy consumers prefer to pay using e-wallets or online transfers such as Net Banking, Airtel Money, Paytm, etc. E-commerce industry is growing at a rapid pace and many customers avoid the option of COD (cash on delivery) as the cost may be slightly high due to inclusion of carrying cost. However, we can't ignore people who are not familiar in using virtual cash. This may affect sales to a marginal extent in volume and amount. Considering the growth of E-commerce start-ups in India, it can be said that almost all end consumers will get accustomed in avoiding COD.

b) Cab start-ups:

They have their own wallet system and the demonetization move is not going to make them bleed. Many people in India use smartphones and pay for cabs through their e-wallets.

c) Wallet start-ups:

It goes without saying that the recent ban on Rs 500 and Rs 1000 currency notes are going to boost the revenue of these start-ups. From teenagers to youth to middle-aged people, everyone will be downloading relevant apps in the next few days and even after that. E-wallet start-ups may also give higher amount of cashback to the new customers to attract higher number of downloads. Eventually, after a few months, the cashback given by these entities would reduce to nil.

d) Food delivery start-ups:

These start-ups allow customers to pay for their food orders through debit cards, credit cards, net banking, e-wallets, etc. So, it is quite understandable that food delivery start-ups like Wow Momo, FoodPanda, Cafe Coffee Day, etc., will be undisturbed by the recent policy implemented.

e) Information technology start-ups: Their services are generally highly priced so the likely mode of acceptance of payments are via bank cheque, bank draft, NEFT, RTGS, net banking, etc. Therefore, it is very understandable that ban of currency notes of two particular denominations are not going to hurt these IT firms.

f) Accounting and financial consultancy start-ups:

They mostly prefer accepting payments other than physical cash. It goes without saying that they would function smoothly irrespective of such massive pan India-based economic policy adopted by the Central Government.

Positive Effects of Demonetization

In what could be termed as the mother of all reforms, Prime Minister Modi's demonetisation move will have far reaching implications. This is not to dispute that the transformative step has brought some hardship for the citizens, but those are temporary and will blow over soon. For the larger benefit of the nation, we the citizens can bear such hiccups with a smile. After all, this is how we as citizens can contribute in policy making and nation building. While bank employees are working overtime to make Modi's ambitious demonetisation drive a success, let's discuss its many-fold impacts.

1. **Black money**: At one stroke the Prime Minister has choked the supply of black money stacked inside the country. Of the Rs 17 lakh crore of total currency in circulation in the country, black money is estimated at mind-boggling Rs 3 lakh crore. Black money is nothing but a plunder of the nation. Black money operators run a parallel economy which shakes the very foundation of the Indian economy. With Modi's demonetisation move, all domestic black money will either be deposited into the banks with heavy penalty or be simply destroyed.

2. **Economy**: Demonetisation will have a huge resultant effect on the Indian economy. The clean-up of illegal cash will help turn around the economy. First, it will bring more borrowings to the exchequer, improve inflation outlook and increase India's gross domestic product (GDP). Second, it will revive investment opportunities and give a fillip to infrastructure and the manufacturing sector. Third, it will help reduce interest rates and lower income tax rate.

3. **Note bank politics**: In the run up to the crucial assembly elections in Uttar Pradesh, Punjab, Goa and Uttarakhand, Prime Minister Modi's demonetisation announcement has come as a shock and awe for the political parties and politicians for whom black money is a lifeline. The pulling out of the old Rs 500 and Rs 1,000 currency notes will help make the election process clean and transparent. But it has brought tough times for the political parties and politicians who believe in the idea of purchasing votes in exchange for notes. That is precisely the reason a rainbow coalition of a galaxy of regional parties and the Congress is building up against Prime Minister, because their political interests are badly hurt.

4. **Real estate cleansing**: It is said that real estate is an industry built on black money. The extent of black money floating around in the sector is huge. According to an estimate at least 40 per cent of real estate transactions in Delhi-NCR are in black. Modi's demonetisation move will curtail the flow of black money into the real estate sector. This will help in making the much needed correction in the sector. The impact: An unexpected dip in land and property prices.

5. **Hawala transactions**: Demonetisation has crippled the Hawala rackets. Hawala is a method of transferring money without any actual money movement. Hawala route is used as a means to facilitate money laundering and terror financing. Hawala rackets run again on black money. With black money suddenly being wiped out of the market, thanks to demonetisation, Hawala operations have come to a grinding halt. According to an India Today report, one of the Hawala operators in Mumbai has destroyed currency notes worth about Rs 500 crores.

6. **Counterfeit currency**: Demonetisation has dealt a death blow to the counterfeit Indian currency syndicate operating both inside and outside the country. Counterfeit currency seriously devalues the real worth of Indian currency. A study conducted by Indian Statistical Institute, Kolkata on behalf of the National Investigation Agency (NIA) suggests that fake Indian currency notes (FICN) amounting to Rs 400 crore are in circulation in the country at any given point of time and around Rs 70 crore fake notes are pumped into Indian economy every year. The estimation is based on recovery and seizure made by various agencies. But the actual figure could be much larger. Needless to say that most of the fake currencies circulated in India are of Rs 500 and Rs 1000 denominations. With Prime Minister Modi‟s decision to pull out the old Rs 500 and Rs 1,000 notes and replace them with new Rs 500 and Rs 2,000 series has completely stalled the circulation of counterfeit Indian currency. Experts say the new currency notes have come with advanced security features which are almost impossible to replicate.

7. **Terror financing**: Terror financing is sourced through counterfeit currency and Hawala transactions. This is how terror financing works. Fake currency circulation is routed through a multi-layered network of Hawala operators which are closely linked to satta (gambling) and smuggling of drugs, opium and arms. Indirectly, they all end up financing terrorism. In addition, the terrorists collect huge donations and then route the money through Hawala transactions. With the circulation of counterfeit Indian currency completely stalled and Hawala transactions stopped, all windows for terror financing are closed.

8. **Maoism**: Maoist sympathisers call Modi’s demonetisation move an “undeclared financial emergency”. There are reasons to it. Demonetisation has hit the Maoists and their movement hard. Black money is the oxygen for Maoists. According to an estimate, Maoists manage to raise Rs 300 to Rs 400 crore annually through donations, levy and extortions. The illicit money is used to purchase arms and ammunition, food and medicine and daily essentials, apart from distributing it among the ranks and the cadre.

Police sources in both Chhattisgarh and Odisha have told the writer that the Maoists have stashed old high denomination notes to the tune of over Rs 10,000 crore at their dumps in the dense jungles of Odisha-Chattisgarh boarder. No wonder, with Modi’s demonetisation drive, all those illegal money are reduced to paper scrap. Maoists are in a state of coma and Maoist activities see a crippling blow. Ever since the demonetisation announcement was made, no major violence was reported from the Maoist infested states like Chhattisgarh, Odisha, Andhra Pradesh and Telangana

9. **Kashmir unrest**: The four-month-long unrest in Kashmir valley is on a backburner, thanks to demonetisation. No stone pelting on security forces has been reported in Kashmir ever since the demonetisation announcement was made. An intelligence estimate suggests that Pakistan sends Rs 1,000 crore annually to the separatists for fuelling unrest in Kashmir. The money is transferred through Hawala route. With Hawala transactions completely choked up, the separatists are now clueless. It won't be wrong to say that "stone pelter" Modi completely shattered the Kashmir unrest with his stone called demonetisation.

10. **North-East insurgency:** Demonetisation has severely affected the multiple militant groups operating in the North-East. According to intelligence estimate the north-eastern insurgent groups together have a corpus of Rs 400 crore annually. The insurgents source their funding in two ways. They raise funds through levy and extortions like the Maoists do.

But unlike Maoists, the leaders of North-East militant outfits do not live in the jungle. Their English speaking high ranking leaders run operations from their dens in Myanmar, Bangladesh and Nepal. From there they also transfer huge illegal money via Hawala route to their cadre for running the militancy. With the extortion money stopped completely in the absence of cash inflow and Hawala operations coming to a complete halt, all activities of North-East militants have shuttered down.

The Short-Term Vs. The Longer-Term Implications

The Short-term Impacts: There will be a disruption in the current liquidity situation as households are likely to get affected by the note exchange terms laid by the government. Though clarity is unfolding on this, commodity transactions and general cash market transactions are likely to feel an immediate impact. Unorganized sector proceedings, including small trade market activities, will remain volatile in the short-term. Roadside vendors, cab drivers, *kirana* stores, etc., have already stopped accepting Rs 500 and Rs 1,000 notes. It is important to note that a significant percentage of the Indian workforce is employed in this sector, which is likely to be affected by immediate liquidity issues. Overall, negative impact on disposable income is expected along with likely disruption in the consumption patterns of the general populace.

The Longer-term Implications:

This essentially represents a change in regime for the real and financial economy. Domestically, there could be some turmoil as the effect will be disproportionately felt by the lower and upper income classes. Internationally, the government is likely to get thumbs up for the move and more countries could potentially see this as a viable option to curb black money and stem illegal financial activity. Last, though this move by the government may not be a first, having being tried by earlier governments as a tool to fight corruption.

The Sectoral Impacts

While sectors with linkages to the unorganized economy are likely to be affected, technology and financial services are expected to gain in the medium to long term. On a sectoral basis, the

commodities and agricultural sector, including the market for consumer durables and non-durables is expected to feel the heat. In the short to medium-term, large denomination purchases will likely be made via electronic purchases rather than through brick and mortar outlets. This will impact the retail sector adversely. The real estate sector is likely to see a significant negative impact in the medium- to long-term, particularly in the repurchase market. There are expectations of a revaluation of current real estate transactions across the board representing possible losses to players in the sector. The luxury goods market is also likely to get affected as this move represents an erosion of real wealth to a large Areas of sub-sectoral impact will be felt in luxury cars, SUVs, gems, jewellery, gems, jewellery, gold and high-end branded products. The real estate sector is likely to see a significant negative impact in the medium- to long-term, particularly in the repurchase market. There are expectations of a revaluation of current real estate transactions across the board representing possible losses to players in the sector. The luxury goods market is also likely to get affected as this move represents an erosion of real wealth to a large number of people. On the positive side, there is likely to a reset of spending patterns as this move represents indirectly a significant push towards a cashless economy. Businesses in the fin-tech sector, including payment banks, mobile wallets, electronic transfer providers, etc., are expected to see gains.

Conclusions:

The demonetization of the highest denomination note undertaken by the government is a big shock to the Indian. The demonetization is taken for several measures such as tax evasion, counterfeit currency and funding of illegal activities. Some people are depositing currency notes in excess of specified limits directly into bank accounts has showed the unaccounted income, subject to higher tax and other penalties. Alternative payment methods, such as e-wallets, online transactions using e-banking, debit and credit card usage have been increased and this will shift an efficient cashless infrastructure.

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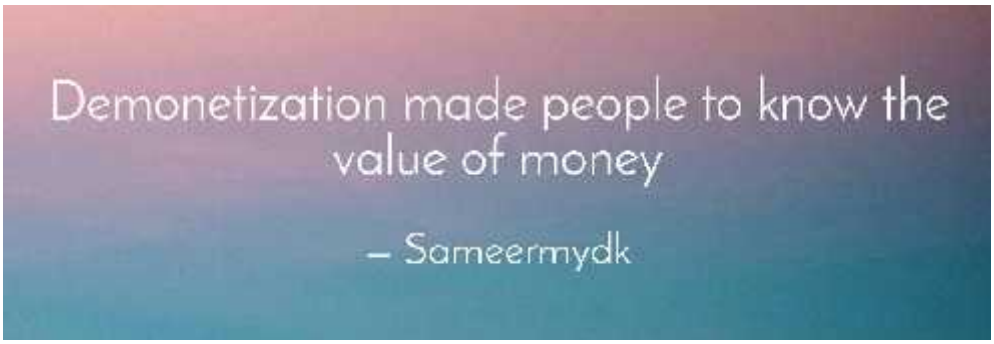

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