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Soft Robots

Researchers have now developed soft robots that are capable of navigating complex environments, such as mazes, without input from humans or computer software.

- Soft robots are **flexible robots** that can be programmed to execute specific tasks.
- Unlike their hard-edged cousins, they can be used to perform more delicate manoeuvres, such as reaching into difficult crevices or holding onto delicate objects.
- They are usually made of **liquid crystal elastomers**, which are polymers having viscosity and elasticity.
- The latest designs have them shaped like **twisted ribbon**, resembling translucent rotini.
- These soft robots demonstrate a concept called '**physical intelligence**,' as opposed to computational intelligence.
- [Structural design and smart materials are what allow the soft robot to navigate various situations by drawing energy from its environment. This is called Physical intelligence.]

- **Working** - Twisted ribbon is placed on a surface that is at least 55 degrees Celsius hotter than the ambient air.
- This causes the portion of the ribbon touching the surface to contract, while the portion of the ribbon exposed to the air does not.
- This induces a **rolling motion** in the ribbon and the **warmer the surface, the faster it rolls**.
- **Navigation** - The ribbon robot navigates in two ways.
- First, if one end of the ribbon encounters an object, the ribbon **rotates** slightly to get around the obstacle.
- Second, if the central part of the robot encounters an object, it "**snaps**."
- The snap is a rapid release of stored deformation energy that causes the ribbon to jump slightly and reorient itself before landing.
- Many soft robots are made to resemble living organisms, such as octopus, and are manufactured using 3-D printers.
- Popular uses of these robots are in surgeries or making specialised exo-suits that can help in rehabilitating patients.
- **Drawback** - The soft materials reduce their durability as well make them harder to control.

Reference

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Stockholm+50

Since the United Nations Conference on the Environment is head towards its 50th anniversary, the Stockholm+50 meeting has been convened.

- Stockholm+50 is an international meeting convened by the **UN General Assembly** to be held in Stockholm, Sweden in June 2022.
- Sweden will host Stockholm+50, with the support of Kenya.
- It will be held during the same week as World Environment Day, which is held on 5 June each year and is also a result of the 1972 event.
- This is being held at a time when the world is facing a **triple planetary crisis** of climate change, pollution and waste, nature and biodiversity loss
- Stockholm+50 will be collaborative and multi-stakeholder in nature.
- It is open to all participants who will be invited to share experiences and initiatives to protect the planet and contribute to sustainable and inclusive development, including recovery from COVID-19 pandemic.
- **Vision -** (Stockholm+50) A healthy planet for the prosperity of all - our responsibility, our opportunity
- **Principles of engagement**
    1. Intergenerational responsibility
    2. Interconnectivity
    3. Implementing opportunity

Stockholm Conference 1972

- The United Nations Conference on the Environment 1972 is also known as the Stockholm Conference.
- It was the first world conference to make the environment a major issue.
- As the idea of the Stockholm Conference was first proposed by Sweden, it's also termed the **"Swedish Initiative".**
- The conference aimed at creating a **common governance framework** for the planetary environment and natural resources.
- The countries agreed to not harm each other's environment or the areas beyond national jurisdiction.
- One of the major results of the Stockholm conference was the creation of the United Nations Environment Programme (UNEP).
- The participants adopted a series of principles for sound management of the environment including the Stockholm Declaration and Action Plan for the Human Environment and several resolutions.

Principles	**Purpose**
Stockholm Declaration	Placed environmental issues at the forefront of international concerns. Marked the start of a dialogue between industrialized and developing countries on the link between economic growth, the pollution of the air, water, and oceans and the well-being of people around the world.
Action Plan for the Human Environment	The Action Plan contained three main categories: 1. Global Environmental Assessment Programme; 2. Environmental management activities; 3. International measures to support assessment and management activities carried out at the national and international levels.

- **Related Links** - Clean, Healthy and Sustainable Environment - A Universal Right, Paris Agreement, UNEP
- **Similar Links** - Stockholm Declaration 2020, Stockholm Convention on Persistent Organic Pollutants, Stockholm Convention on Persistent Organic Pollutants

Reference

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Antarctica Treaty System

- Antarctica is defined as all land and ice shelf south of 60°S, but not the surrounding waters.
- It is regulated by the Antarctica Treaty System (ATS) ratified by **12 countries in Washington** in 1959.
- [12 countries are Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, the Union of Soviet Socialist Republics, the UK and the US.]
- The Antarctic Treaty System is the whole complex of arrangements made for the purpose of regulating relations among states in the Antarctic.
- The treaty aims for
    1. Peaceful exploration of the continent for science and prohibits military activity other than as support for research;
    2. Free exchange of information and personnel with the UN and other international agencies; prohibits new territorial claims;
    3. Disallows nuclear explosions or disposal of radioactive wastes; and
    4. Gives treaty-state observers free access to all stations, premises and equipment.
- **Working** - The Treaty is augmented by recommendations adopted at Consultative Meetings, by
    1. The Protocol on Environmental Protection to the Antarctic Treaty (Madrid, 1991),
    2. Convention on the Conservation of Antarctic Seals (London 1972),
    3. Convention on the Conservation of Antarctic Marine Living Resources (Canberra 1980).
- **Members** - Before this treaty was ratified, the UK, Norway, New Zealand, Chile, Argentina, Australia, and France had made territorial claims in Antarctica.
- Australia's claim is the largest; almost half of the entire continent.
- ATS has been signed by 53 countries, including India (1983).
- By not signing the treaty, the United States, Russia, South Africa, Peru, and Brazil reserve the right to make territorial claims.
- The "no new territorial claims" rule means earlier claims by the rich nations must be respected by the signatories.
- In a way, ATS is similar to the Nuclear Non-Proliferation Treaty: Both endorse privileges to "wealthy imperialists" in the field and can be termed vestiges of colonialism.
- **Related Links** - Antarctica, Arctic Council, India's Arctic Policy, Iceberg A68, Ameri Ice Shelf

Indian Antarctic Programme

- The Indian Antarctic program, which began in 1981, is a scientific research and exploration program.
- The National Centre for Polar and Ocean Research (NCPOR), Goa - an autonomous institute under the Ministry of Earth Sciences - manages the entire Indian Antarctic program.
- It has taken scientific expeditions, and has built three permanent research base stations in

Antarctica.

Research Base Stations	Purpose
Dakshin Gangotri (1983)	India's first scientific research base station established in Antarctica.
Maitri (1988)	Situated on the Schirmacher Oasis, it is India's second research station. Lake Priyadarshini is a freshwater lake that India built around Maitri.
Bharati (2012)	India's first committed research facility located east of Maitri.

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4. https://wii.gov.in/antarctica_program

Colour of Neptune and Uranus

Astronomers have an explanation for why Neptune and Uranus are different colours.

- Neptune and Uranus have much in common (similar masses, sizes, and atmospheric compositions), yet their appearances are notably different.
- At visible wavelengths Neptune has a distinctly bluer colour whereas Uranus is a pale shade of cyan.
- Now, a single **atmospheric model** that matches observations of both planets has been developed, using observations from the Gemini North telescope, the NASA Infrared Telescope, and the Hubble Telescope.
- New research suggests that a **layer of concentrated haze** that exists on both planets is thicker on Uranus than a similar layer on Neptune and 'whitens' Uranus's appearance more than Neptune's.
- **Excess haze on Uranus** builds up in the planet's stagnant, sluggish atmosphere and makes it appear a **lighter tone than Neptune**.
- If there were no haze in the atmospheres of Neptune and Uranus, both would appear almost equally blue.

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Reasons for Stagflation

Authorities worldwide are trying to formulate the appropriate set of policies to ensure that stagflation; currently running at multi-decade highs in some advanced economies is cooled without triggering a recession.

- The slowdown in economic activity, in turn, leads businesses to shed jobs and the resultant situation is termed as '**stagflation'**.

- **Reasons for latest concerns about stagflation -** The outbreak of the COVID-19 **pandemic** and the curbs imposed to contain the spread of the virus caused the first major recent economic slowdown worldwide.
- But, the **subsequent fiscal and monetary measures** taken to address the downturn, including substantial increases in liquidity in most of the advanced economies, fuelled a sharp upsurge in inflation.
- The US Fed and the Bank of England are among central banks that have started **raising interest rates** to cool soaring prices.
- But, the **ongoing war in Ukraine** following Russia's invasion of its southern neighbour and the consequent Western sanctions on Moscow has caused a fresh and as yet hard-to-quantify 'supply shock'.
- There is a sharp surge in prices of commodities ranging from oil and gas to foodgrains, edible oils and fertilizers due to the wake of the conflict.
- Authorities face an uphill battle to contain inflation that is now less a function of demand (and so can be controlled by regulating credit) and almost entirely caused by supply factors that are far harder to manage.

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