Computers in Entertainment, Science, Medicine and Engineering

- Entertainment
  - Computers have now become an integral part of the entertainment industry.
  - Used to create dazzling special effects in movies, editing movies, creating movies using animated cartoon characters,
  - Help in composing, editing, recording and reproducing music and sound effects.
  - In sports to analyze the movements of sportspersons and to find faults in the movements and optimize the movements so that maximum efficiency is achieved.
  - Simulates games to try out different game strategies.

  - Movies
    - Animated movies, special effects
    - With the aid of sophisticated graphics and animation packages the special effects technicians can create the illusion of a locomotive flying through the air or a robot transforming into a human being and so on.
    - In theater – lighting, sound system
    - Improving productivity by automating time consuming, repetitive and monotonous process.
    - Contains many virtual tricks, and treats that could never be accomplished without the aid of computers.
  - Music
    - Any musical composition that we hear goes through a technological process at some point
    - MIDI (Musical Instrumental Digital Interface)
    - Before MIDI, synthesizers could 'note' information to other synthesizers only if they were compatible and very often they were not.
    - Problems with interfacing electronic musical instruments manufactured by different companies.
    - Patch librarian program – small amount of memory which can remember some music
    - Sequencer - memories any thing you play and plays it back on command.
    - Based on pure mathematical methods involving recursion , iteration and complex mathematics.

  - Advertising
    - Has been one of the key factors of growth and success in business
      - Multimedia in advertising and promoting products
      - Utilization of internet.
    - Low cost, animation, computer graphics, sound and videos
  - Art
    - New tools but also a new fine arts medium

        - Capable of transforming art from visual experience to full emotional interaction with the work.

- Medicine
    - Revolutionizing the medical field
    - Performing a wide variety of tasks
    - Used for
        - Everything form diagnosing illnesses and monitoring patients to controlling movements of robotic surgical assistants
        - Used for that vary in complexity from recording of patients history and treatment details to monitoring the patients.
        - A;sp used in automating the hospital management system
        - Automate the billing and other administrative process
        - Digital and imaging technology have helped in better diagnosis
        - Biomedical engineering – development of laboratory and medical equipments that are better and more accurate.
        - Innovative medical applications use small, special purpose computers.
            - Pacemaker
                - an electronic device that is surgically implanted into the patient's heart and chest to regulate heartbeat
            - Cochlear implant
                - An electronic device that is implanted in the inner ear to restore some hearing to a deaf person.
        - Photographs of internal problems such as blood clots and tumors that previously could be seen only during exploratory surgery.
        - Monitoring and automated drug administration
        - MRI (Magnetic Resonance Imaging) – uses radio waves and strong magnetic field to scan a patient's body
        - CT Scan – Computed Tomography Scan
            - A type of imaging scan that shows the internal structure of a person's brain. In diagnosing dementia, CT scans can reveal tumors and small strokes in the brain.
        - Telemedicine – make the life of patients easier and enable them to get high quality medical care irrespective of their physical location.
        - Physical challenged individuals
        - Voice recognition system
        - OCR
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- Science
    - Use computers to develop theories, to collect and test data and to exchange information electronically with colleagues around the world.
    - Models of Molecules, space, satellite
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- Engineering
- Helps to reduce the cost of design, production and manufacturing.

- EDI (Electronic Data Interchange)
  - EDI is the computer to computer exchange of business documents on a standard formats.
  - These formats look much like standard forms though highly structured.
  - Purpose order format
- CAD/CAM(Computer Aided Design/ Computer Aided Manufacturing)
  - Popular tool for product design
  - Are computer programs or integrated packages for workstation hardware and software that allow the user to draw and easily modify product designs on a computer screen.
  - Major benefits:
    - Graphics capabilities
      - Allows designers to view a product form different perspectives, including three dimensional rotations and various cross sections.
      - Change in scale, change in angle of arc etc
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    - Design, storage and retrieval
      - Can store the design characteristics of existing products and components
      - This capabilities not only promotes the use of common components but also reduces the design time
    - Automatic evaluation of specification
      - One of the most Time consuming aspect of design for highly technical products is calculating whether or not product specifications such as strength, heat resistance are satisfied
      - These things can be programmed in CAD model so that if the designer change the design (shapes or materials) these performance characteristics are also recalculated automatically and compared to the product requirements (Computer Aided Engineering)
- Product data management(PDM)
  - To maximize the time – to- market benefits of the concurrent engineering while maintaining control of your data and distributing it automatically to the people who need it, when they need it.
  - The way PDM systems cope with this challenge is that master data is held only once in a secure where its integrity can be assured and all changes to it monitored, controlled and recorded.
  - Some of the benefits are:
    - Reduced time to market
    - Improved design productivity
    - Better use of creativity team skills
    - Data integrity safeguard
    - Better management of Engineering change
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- Prototyping

        - Generate computer prototype which can be distributed and tested by actual customers
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    - Project management
        - Managing the projects.