Session Schedule

- CIM hardware and software considerations
  - A brief case study for CIM database design
Introduction to manufacturing automation and CIM (Computer Integrated Manufacturing)

- Automation:
  - set of all measures aiming at replacing human work through machines
    (e.g. automation is applied science)
  - the technology used for this purpose
    (e.g. this company has an automation department)

- Automation:
  - replacement of human work through machines
    (e.g. the automatisation of the textile factory caused uproar of the workers)
  - replacement of conscious activity by reflexes
    (e.g. drill of the sailors allows the automatisation of ship handling)

- Automation:
  - The use of computers and machines instead of people to do a job

CIM hardware and software considerations

- CIM equipment:
  - CNC machines
  - Computerized work centers
  - Robotic work cells
  - DNC/FMS systems
  - Work handling and tool handling devices
  - Storage devices
  - Sensors, shop floor data collection devices
  - Inspection machines
  - Computers, controllers
  - CAD/CAM systems, workstations / terminals, data entry terminals, bar code readers, RFID tags
  - Printers, plotters and other peripheral devices, modems, cables, connectors
CIM hardware and software considerations

- CIM software comprises computer programs like:
  - Management Information System; Database Management
  - Sales, Order Entry
  - Marketing
  - Finance
  - Analysis; Modeling and Design
  - Simulation
  - Inventory Control; Materials Handling
  - Monitoring; Shop Floor Data Collection
  - Process Planning
  - Manufacturing Facilities Planning; Production Control
  - Work Flow Automation
  - Quality Management

CIM Database management

- Varied tasks one might expect to accomplish in a CIM environment:
  - Designing assemblies and performing tolerance analysis on those assemblies.
  - Preparing production drawings of assemblies, individual parts, tooling, fixtures and other manufacturing facilities.
  - Preparing part lists and bill of materials (BOM).
  - Preparing process plans for individual part manufacture and assembly.
  - Programming CNC machines for processing complete parts (CAM).
  - Designing work cells and programming the movement of components in those cells using work handling devices like robots, conveyors, AGV’s/ RGV’s.
  - Preparing inspection programs including programs for CNC machines.
Third step:

- Theoretically plan the procedures which enable:
  - The storage of object related data (attributes)
  - The sort of data related to an array of objects (Tables, Primary keys)
  - The storage of relation among related objects (relational database, Foreign keys)
  - The retrieve operation of a definite object by means of its attributes (Select)
  - The modification/delete operation of a definite object by means of its attributes (Update/Delete)

Make your own CIM database !!
Provide a simple implementation regards to your theoretical activities in steps one to three:
- Define a simple discourse
- Use a programming language
- Define some simple objects in the selected discourse
- Define some simple attributes for selected objects
- Implement your theoretical procedures in step 3

The HW should be sent to FValilai@sharif.edu.
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