Tutorial 8 Top Down
1a)   A microprocessor may be cheap, but to make it work in a system, we need:
        i) Hardware circuit design and software for microprocessor
        ii) System development - debug and test needs skilled technical persons

        So the final microprocessor based product will cost much more.

b)   Product requirement is a description of the product's intended function. To make it clear
       and keep it in mind as you design it will avoid "creeping featurism" and "missing
       features".

c)   No - examination of requirements, feasibility studies and simulation may show up areas
       which need modification of requirements and so on which leads to another cycle of
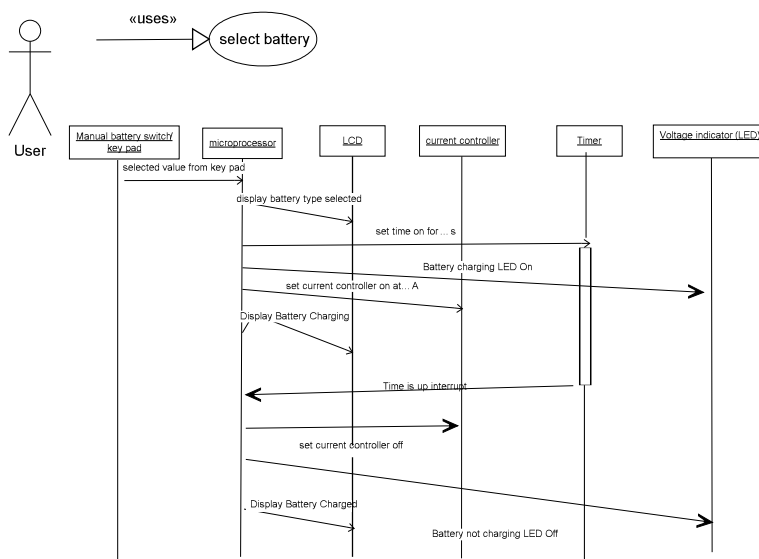   activity.

2.   Goals:
       - Design a battery charger that controls the current based on battery type and terminal voltage.
       - Charge for a period based on the battery type.
       - Indicates visually when the charging is finished.

       Constraints: Waterproof, can't use ON-OFF control for current

       Subsystems: Timer / LCD / Current controller / Battery switch / key pad
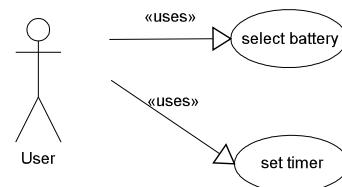   Voltage indicator (LED) / microprocessor

Fig 3 Interaction Diagram for "Select Battery" case

Other solutions possible and encouraged!

3a)   A cycle of activities involving examination by system designer of the customer requirement, consequent modifications of requirement by customer, further examination, and so on.
Considerations in system analysis:
- Identifying hardware constraints
- Identifying subsystem
- Tasks and algorithms
- Feasibility studies and simulation

b)   By first identifying the hardware subsystem, we can produce part of the system specifications immediately. As the characteristics of the subsystem are already known, they can be used to check how to interface this subsystem to the other parts of the system.

c)   Feasibility studies which are done at the *early part* of the design cycle, can remove much of the uncertainty without the *expense* of designing to the prototype stage. This is done to see if project constraints can be met, and check the performance and quality of the proposed system.

4.   Time constraint: developing need much longer time.
Designer constraint: no skilled professional engineers.
Product designed from scratch may not work well and need a long modification cycle.

5.   Support availability
Information readily available
Experience can be tapped
Capability (addressing range and speed) with special features of the processor

Ready made boards, Software, Development tools, Documentation (data sheets and programmer's guide)

COST!