Business Studies 2002

p8q5
JAL

1.
   a. Distinguish between top-down, bottom-up and spiral (rapid prototype) development methodologies. Illustrate your answer with reference to an example of designing a building. [5 marks]
   b. You are in charge of commissioning the design of a new building, such as the new Computer Laboratory building. Draw up a high-level GANTT chart for this task up to the letting of the building contract. [10 marks]
   c. Discuss what monitoring and quality control procedures might apply to the design process. How will you get the agreement of the various stakeholders? [5 marks]

Distinguish between top-down, bottom-up and spiral (rapid prototype) development methodologies. Illustrate your answer with reference to an example of designing a building.

Top –down methodologies start with a high-level view of the problem, and, at each iteration break it down into smaller steps, until the individual module is capable of implementation.
For example a software task might, at the top level, be decomposed into

- Initialise
- Do work
- Clean up

And then Initialise be further decomposed into

- Initialise static variables
- Initialise dynamic variables

Parnas claimed that each level of decomposition should embody a single design decision for each module.

Bottom up, by contrast, starts at the lowest level of decomposition and designs successively larger aggregations, with each layer implemented using the "meta-machine" of the layer beneath. This design style is used, for example, for object-oriented programming

To use a building analogy, top-down starts with the grand vision of the building and adds detail, whilst bottom-up starts with basic modules, such as doors and windows, then builds room-modules, eventually combining them make the building design.

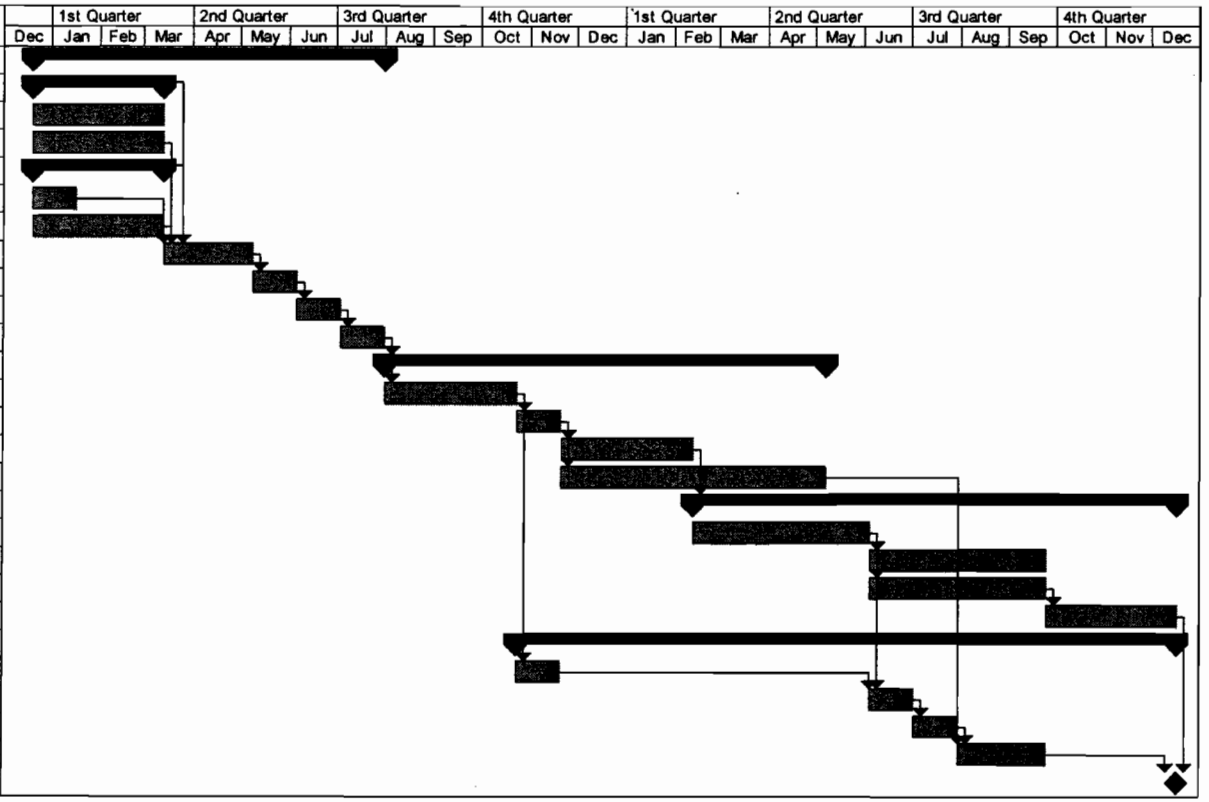
One problem with both top-down and bottom-up approaches is that they are juggernauts: a mistaken decision earlier in the process is hard to correct later. Another problem is that the level of detail makes it difficult to comprehend the design at intermediate stages. To overcome these difficulties spiral development or rapid prototype methodology was developed by Bohm and others. Here a small subset of the project is first developed, and then incremental additions are made to this stable core. For example the major screens of the user interface could be mocked up, and

then progressively implemented. The advantage of this method is that here is always a stable fall-back position, and good visibility, assuring better real-world fit.. In terms of a building, the analogy might be, as most buildings of any age are, a collection of extensions and alterations to the original smaller core.

d. You are in charge of commissioning the design of a new building, such as the new Computer Laboratory building. Draw up a high-level GANTT chart for this task up to the letting of the building contract.
[10 marks]

(N.B. Marking guidelines: Candidates are not expected to know the details of how to design a building, but should demonstrate that they know what a GANTT chart is, and using common sense produce a reasonable and logical sequence, including periods for user consultation. The exact details and time estimates in the chart aren't important. Marking the critical path would be a bonus..)

ID	Task Name	Duration
1	**Prepare Brief**	**160 days**
2	**Gather Requirements**	**60 days**
3	Consult users	3 mons
4	Consult others	3 mons
5	**Gather constraints**	**60 days**
6	Budget	1 mon
7	Planning and regulatior	3 mons
8	Prepare brief	2 mons
9	Check Brief with users	1 mon
10	Select architects	1 mon
11	Breif architects	1 mon
12	**Outline design**	**200 days**
13	Concept	3 mons
14	Build models etc	1 mon
15	Validate with users	3 mons
16	Planning permission	6 mons
17	**Detailed Design**	**220 days**
18	Structure	4 mons
19	Services	4 mons
20	Interior	4 mons
21	Check with users	3 mons
22	**Comission building works**	**300 days**
23	Select builders	1 mon
24	Tender	1 mon
25	Tender receipt	1 mon
26	Legals	2 mons
27	Let contract	0 days



Discuss what monitoring and quality control procedures might apply to the design process. How will you get the agreement of the various stakeholders [5 marks]

Mention:
Milestones throughout the process
Design reviews and walkthroughs
Visualisation tools (the William Gates building was modelled by the Martin Centre using a version of the Quake engine)
Clear objectives at each stage
Frequent consultation with users and other stakeholders