What is functional analysis?

- Specifying what the system should do ... from the users perspective
  - owner, sponsors, dept. managers, customers, suppliers, users - direct and indirect
- **The Functional Specification is foundation of systems development ... get it wrong and the system will fail**

The steps ....

1. **Determine the requirements**
   - fact-finding activity – interview, questionnaire, observation, documents, forms, prototype

2. **Structure the requirements**
   - detailed and clear description of the business requirements using:
     - narrative
     - models
       - Process models - Data Flow Diagrams
       - Data models – Entity Relationship Models
       - Object/class models – Domain Models

Analysis

‘The resolution or breaking up of anything complex into various elements; the exact determination of the elements or components of anything complex’ OED 2nd Ed.
- examine minutely
- break into parts
- identify/show elements (‘what makes it tick’)
- describe it (write down to communicate)
- complex systems – part AND whole

The skills required

A successful systems analyst must have the following skills:
- **Analytical**
  - systems thinking, problem identification, problem analysis
- **Technical**
  - the potential and limitations of a range of technologies
  - Business knowledge
    - common business methods, governmental requirements
- **Management**
  - project management, resource management, change management
  - interpersonal skills
    - written and oral communications, interviewing, listening, group management.

Understanding the requirements

- The business objectives that drive what is done
- How work is done
- The information people need to do their job
- The information required within the organisation to support the organization’s objectives
Understanding the requirements

- When, how, and by whom is the information moved, transformed, stored
- The sequence and other dependencies among different information handling activities
- The rules governing how information is handled and processed
- Key events affecting information and when these events occur

Event analysis

- a technique for identifying and describing system requirements
- Information system provides pre-planned responses to significant occurrences (EVENTS) in the system environment
- a starting point for Object-Oriented analysis and design techniques

Event analysis - Example

1. identify significant business event
   - eg. submission of a paper to Conference
2. identify actors who interact with the system
   - generates system input
   - receives system output
   - eg. Author
3. identify system input/ system output
   - paper registration
   - acknowledgement of receipt of paper

Event analysis for Object-Oriented systems development

break up the complex system by partitioning it into separate business events

- significant business event is EVERY situation the system MUST respond to
- sequence the actions within an event
- identify those events which are independent of others
- keep your analysis technology independent

Event

- triggers a response from the system
- before or after the event the system is idle
  - external event
    - eg. author prints a final draft of her paper
  - internal event
    - eg. reviewer reaches the allowable maximum number of papers to review
  - temporal event (event which occurs at a pre-specified time)
    - eg. periodic input/ output – time when call for papers expires

Event flow (control flow)

- signal/message that notifies the recipient that a particular event has occurred
  - eg. ‘Paper Registration’ form
- event flow from external event must contain sufficient data about the event in order for the system to respond appropriately
  - eg. ‘Paper title’ and ‘Author name’ are not enough for the jobs that have to be done in the system
- system may recognise that an event has occurred:
  - direct recognition: event always sends an information flow to the system eg. interested author always submits registration
  - indirect recognition: system infers the occurrence of an event from the input it receives eg. system clock passes closing date for Paper submissions
Data flow

Application-specific data elements which specific values which describe the details of the event

- Author registration’ might consist of:
  - Author name;
  - Author_email_address;
  - etc.
- the data’s arrival triggers the system to respond
- the flow contains data (the system does not currently have) which is essential to produce the desired response from the system

Event description - diagramatic

Event description - narrative

Business event analysis for system requirements

Scale of detail:
1. Events on a level of the system as a whole
   - cf Level 1 DFD
2. Events on a level of system sub-function
   - cf All other levels DFDs

Events described:
- a. Events to which the system is expected to respond
- b. Incoming message (event or data flow) associated with each event
- c. Desired response
- d. Actions/behaviours required to generate the response for each stimulus

Business event analysis for system requirements (ctd)

• Identify actors
  a. interact with system
  b. generate system input
  c. receive system output
  d. give them a name eg. ‘Paper Review Panel’
• Identify system inputs and outputs
  a. what information about an event is entering the system
  b. what information about an event is leaving the system
  c. give them a name eg. ‘Review completed advice’

Business event analysis for system requirements (ctd)

- Describe a temporal event
  - syntax: (Time to) action of the system
  - eg. ‘(Time to) produce a list of submitted papers’
- Describe external business event
  - syntax: Subject action
  - eg. ‘Author withdraws submitted paper’
### Hints About Event Analysis

- Ignore the technology of implementation – build an essential event model.
- Model the system’s complete response – don’t split a single event into fragments.
- Isolate individual events – don’t combine events if the system must wait in between them.

### References