

Exercises on software requirements

On requirements

Which of these are functional requirements?

- a) Users of the library will be either normal or staff
- b) A user will be able to borrow a book
- c) A staff person will be able to borrow a book
- d) The library contains one million books
- e) If a user asks a book that has been borrowed, her request shall be inserted in a waiting list
- f) Staff shall have no priority in borrowing books

On requirements

Which of these are non-functional requirements?

- a) Pressing the switch, the room shall get lightened
- b) Pressing the switch, the room shall get lightened in less than one second
- c) If the room is dark, pressing the switch it shall get lightened
- d) The light in the room must be sufficient to read
- e) If someone is reading then the light must stay on
- f) After two minutes that the room is empty the light must switch off

On requirements

Which of these are functional requirements?

- a) A person can enroll in a course
- b) Only 10 persons max can enroll to this course
- c) A student is a person
- d) A course is taught by a professor
- e) A professor is not a student
- f) Each course terminates with an exam
- g) Every exam produces a ranking of all participants

On requirements

Which of these are functional requirements?

The Iphone

- a) can function as a camera
- b) has a camera with 2.0 megapixels with geotagging
- c) is a portable media player
- d) offers an Internet client
- e) renders a virtual keyboard by its multitouch screen
- f) is connected to a PC via a USB plug
- g) includes a digital compass in the 3GS model

Quiz

This requirement is not well written. Why?

- The alarm shall remain active for 5 seconds.
- It is an incomplete statement. Is it audio or visual alarm or both?

Quiz

This requirement is not well written. Why?

- When primary is lost, secondary unit takes over
- Is this a “must” or is this “optional”?
Use words like “must” (or “shall”) consistently

Quiz

This requirement is not well written. Why?

- The system shall purge state control records and files that are older than the retention period
- The requirement is incomplete and vague without specifying the retention period or providing reference as to where the information can be obtained. The requirement cannot be implemented or tested as stated.

Quiz

This requirement is not well written. Why?

- When performing calculations the software shall produce correct results.
- This requirement is not necessary. This type of requirement is inherent to correctness should not need to be specified, unless it refers to a specific (complex) calculation and what is considered as correct.

Quiz

This requirement is not well written. Why?

- The output of the program shall usually be given within 10 seconds
- The requirement contains a general word “usually”. Is there any condition in which this requirement should not be the case? The requirement is also incomplete: the output of the program is not specified. Also, when do you start counting the 10 seconds? the Requirement cannot be implemented or tested as stated.

On requirements

- Based on the following statements from a domain expert on a project, which of the following are requirements that **must** be extracted?

"We get incomplete mortgage applications all the time. In those cases, we just hand them back to the customer with a handwritten note telling them what's missing. We have to log the application anyway, so we use the new mortgage screen to enter the customer information and assign a unique identifier to the file. In the past, we have entered the address in upper case. The identifier follows an industry standard format of bank number, customer account number, and the next available number for that customer all as one long number."

- a) A note must be sent to the customer for incomplete mortgage applications, listing the missing items
- b) A file must be established for every mortgage application at the time it is submitted, whether the application is complete or not
- c) Addresses on mortgage applications must be entered as all capital letters
- d) A unique mortgage number must be assigned to each mortgage file. This identifier must follow financial industry standard format

On requirements

Which requirement has the best form?

- The system could be used to manage one or more libraries
- The system shall manage the lending of books
- The system is initially either off or on
- The system could have several users
- The system goal should be to let users to borrow books

Supermarket

Descrivere mediante casi d'uso

- Un supermercato ha un programma di punti fedeltà.
- Per i clienti partecipanti (registrati e con tessera) ogni spesa dà diritto a punti, un punto per ogni euro; in certi casi (definiti dalle politiche del supermercato) i punti sono doppi o tripli
- I punti possono essere usati per sconti su prodotti speciali o per pagare la spesa (un centesimo di euro per ogni punto)
- Se il cliente ha dimenticato la tessera conserva lo scontrino e la volta successiva che fa la spesa gli vengono accreditati i punti dalla cassiera
- Se un cliente raggiunge 100.000 punti tutte le casse si illuminano e le cassiere battono le mani

Pronto pizza

- Descrivere i casi d'uso di un prodotto software “Pronto Pizza” per gestire ordini di pizze via Web oppure email
- Prevedere i seguenti tipi di ordine:
 - di singola pizza;
 - di pizza e bevanda;
 - di offerte speciali (es. ogni 4 pizze una bevanda gratis)
 - di consegna urgente.
 - aggiungere un caso d'uso per la preparazione e uno per la consegna della pizza.
- Mostrare almeno uno scenario con i punti di variabilità legati: alle offerte speciali; alla consegna della pizza (VIP o normale); alla creazione di profili utente

Web radio

- Descrivere i casi d'uso di un prodotto software per gestire una radio Web.
- Prevedere le seguenti opzioni di interazione con gli ascoltatori: richiesta singola canzone o canzone con dedica; richiesta di playlist (es. lista di tre canzoni dello stesso interprete); richiesta di ascolto con scrobbling, cioè basato su profilo di preferenze musicali. Prevedere anche un caso d'uso per l'acquisizione di nuove canzoni.
- Mostrare almeno uno scenario con i suoi punti di variazione

Application store

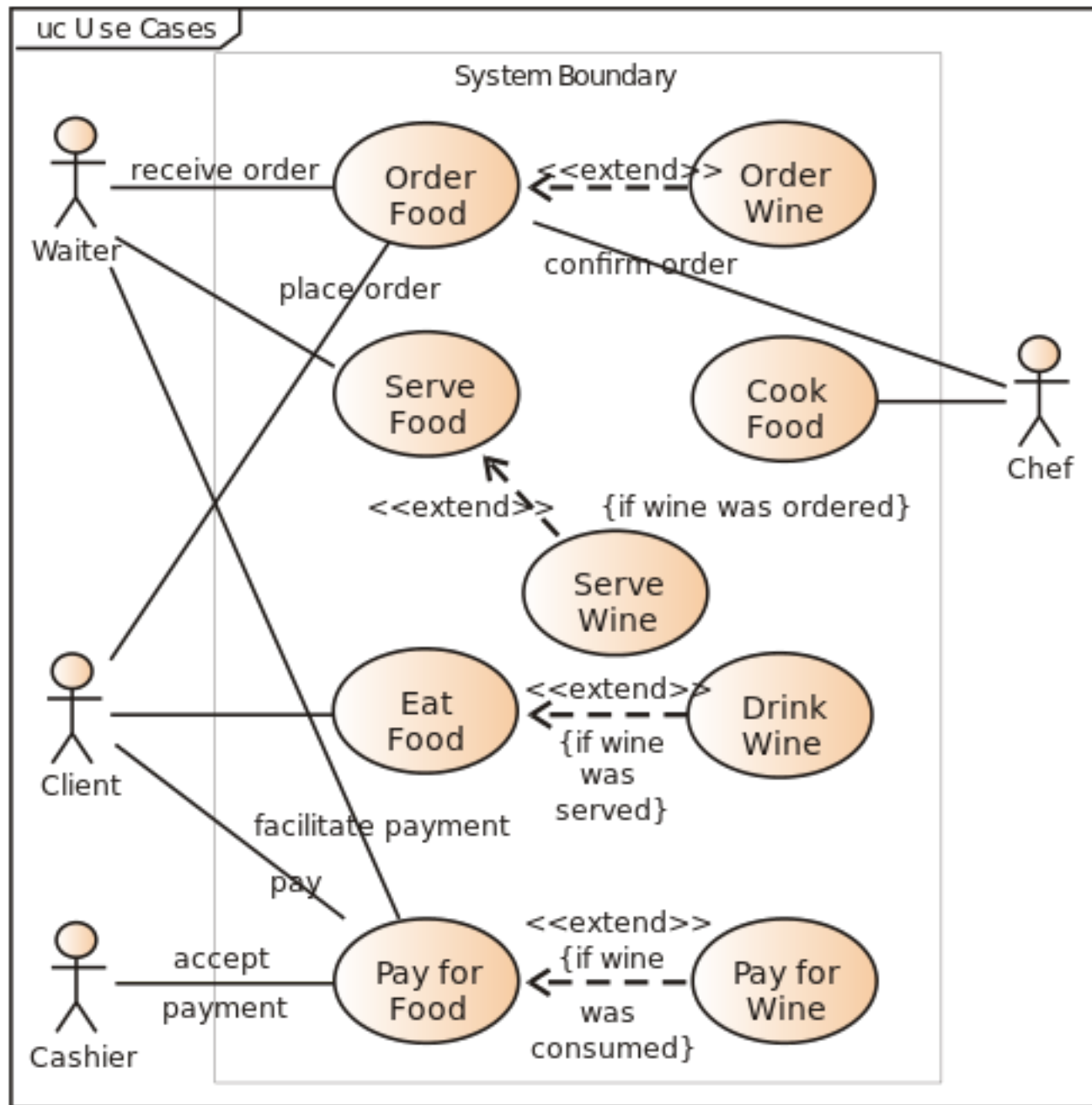
- Descrivere un diagramma dei casi d'uso di un application store per cellulari
- Evidenziare almeno le operazioni di
 - acquisto app (con o senza registrazione sul sito);
 - aggiornamento gratis di una app già acquistata;
 - definizione del profilo cliente con opzioni di pagamento
 - a) con carta di credito
 - b) con carta di debito
- Modellare le feature comuni e variabili considerando opzionale la gestione dei profili

Biglietteria aerea

- Descrivere un diagramma dei casi d'uso di un sistema di biglietteria su sito Web per viaggi low cost in aereo.
- Evidenziare almeno le operazioni di i) acquisto biglietto sola andata o andata e ritorno (con o senza registrazione sul sito); ii) modifica data biglietto precedentemente acquistato, a pagamento se manca meno di un mese alla partenza oppure gratis in caso contrario; iii) check in on line con opzioni a) di scelta del posto a pagamento b) imbarco con priorità
- Definire le seguenti varianti: con e senza profilo dell'utente; con e senza modifica di prenotazione; con e senza possibilità di check in

Mensa

- Un sistema mensa ha clienti, cuochi, serventi e cassieri
- I cuochi preparano i cibi, i clienti ordinano i pasti e li mangiano
- Il pasto è definito dalla scelta di elementi che si basano su colore del vassoio (primo), gettone grande (secondo), colore del bicchiere (contorno), gettone piccolo (frutta o dessert).
- Il cassiere incassa il pagamento in contanti o in ticket; se richiesto, fa pagare il vino e mette sul vassoio un gettone quadrato rosso o bianco
- I serventi in linea riempiono il vassoio con i vari piatti come richiesto, eventualmente mettendo assieme secondo e contorno; se c'è il gettone quadrato mettono il vino del colore corrispondente
- Modellare le feature comuni e variabili individuando per es. come variabile la gestione delle richieste di vino



Exercise: library

Analyze the library system

- Find the kernel UC
- Add two optional UC
- Add two alternative UC
- Describe a scenario with its variation points
- Define a feature model

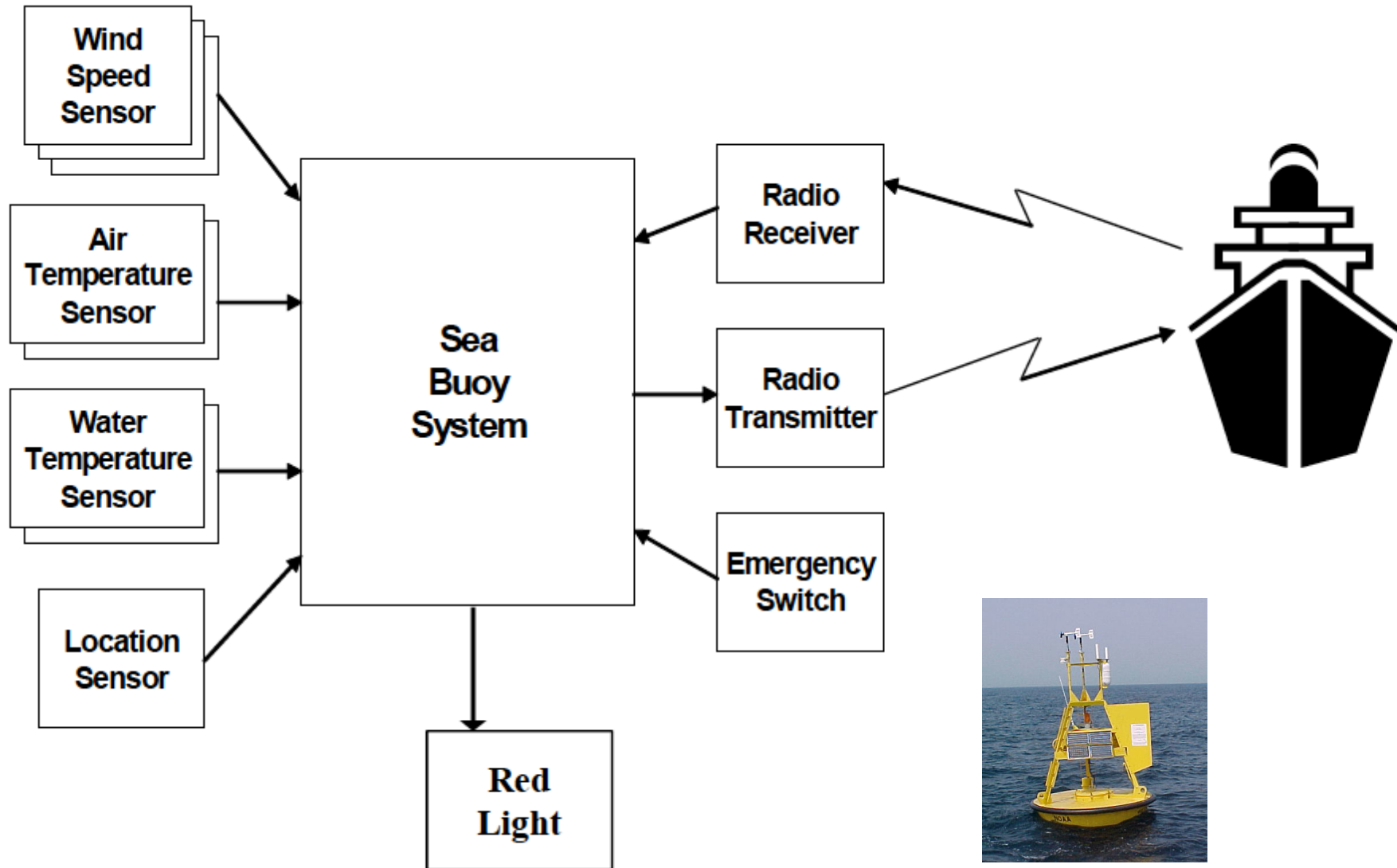
Conference registration

- A small company sells conference registration systems
- Use cases: registration to whole conference, registration to single days, registration to side events, requests for lodging, requests for traveling, matching authors of papers with registered people
- Features: conference, side events, services, paper matching

Lift system

- Specify the software system controlling a single lift or a system of lifts
- Core use cases:
 - call from inside, call from outside, alarm from inside
- Optional:
 - Call several lifts with one button
 - Have display updated with lift position for each floor
 - Lift with internal server
 - One lift is reserved for service purposes

Sea buoy



Commonality

- We want to produce a family of sea buoy systems that provide navigation data to air and ship traffic at sea or weather data for use in forecasting and climate study.
- The buoys collect weather data (i.e., air and water temperature, wind speed) and navigation data (i.e., location) through a variety of sensors. (See preceding slide)
- Each buoy is also equipped with a radio transmitter (to broadcast weather and navigation information) and a radio receiver (to receive requests from passing vessels)
- Software for each buoy must:
 - maintain current wind, temperature, and location information; wind speed readings are taken every 30 seconds, temperature readings every 10 seconds and location every 10 seconds; wind and temperature values are kept as a running average
 - broadcast current wind, temperature, and location information every 60 seconds
 - broadcast wind, temperature, and location information from the past 24 hours in response to requests from passing vessels; this takes priority over the periodic broadcast

Variability

- Each buoy may have a different number of wind and temperature sensors and may be modified to support other types of sensors in the future
- Some buoys are equipped with
 - a red light, which may be activated or deactivated based upon a request from a passing vessel during sea-search operations
 - an emergency switch, which may be flipped by a sailor to initiate an SOS broadcast. This signal takes priority over all other broadcasts and continues until reset by a passing vessel
- The priorities and timing constraints may be modified