

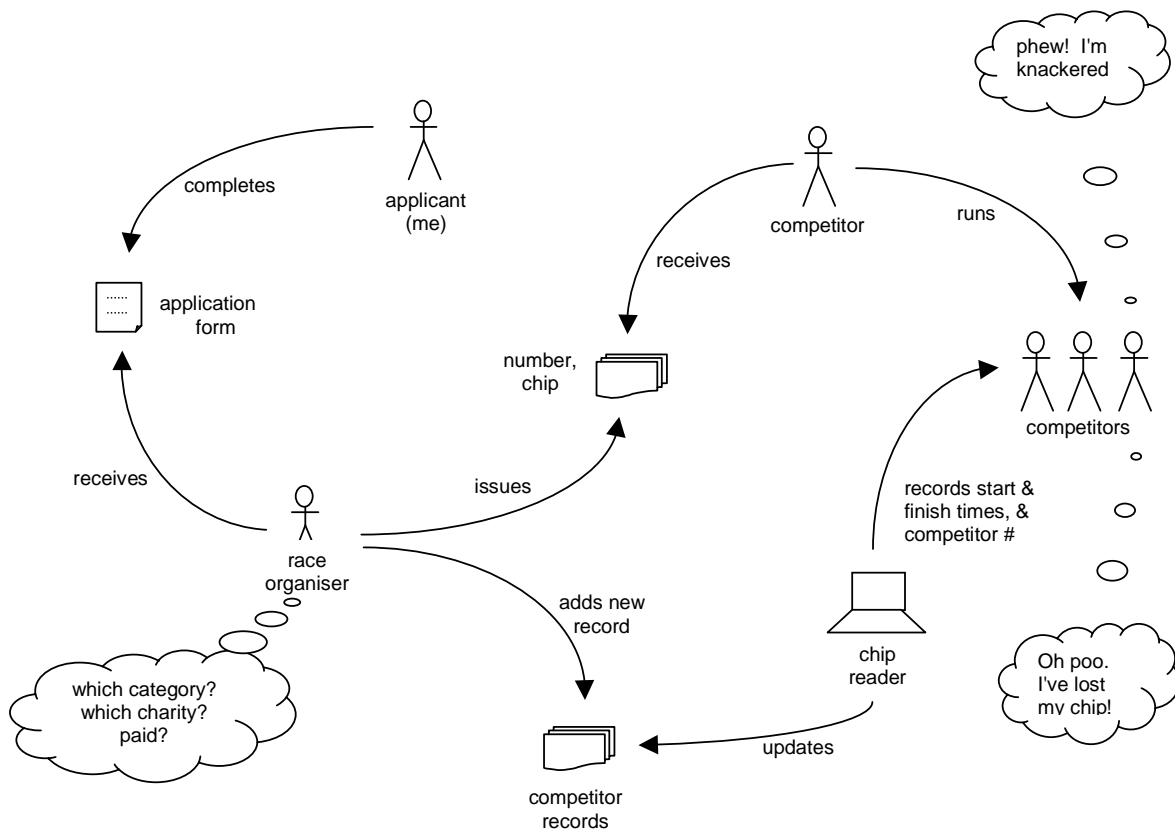
Systems Analysis and Design

16 System Specification

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We specify a city marathon management system.

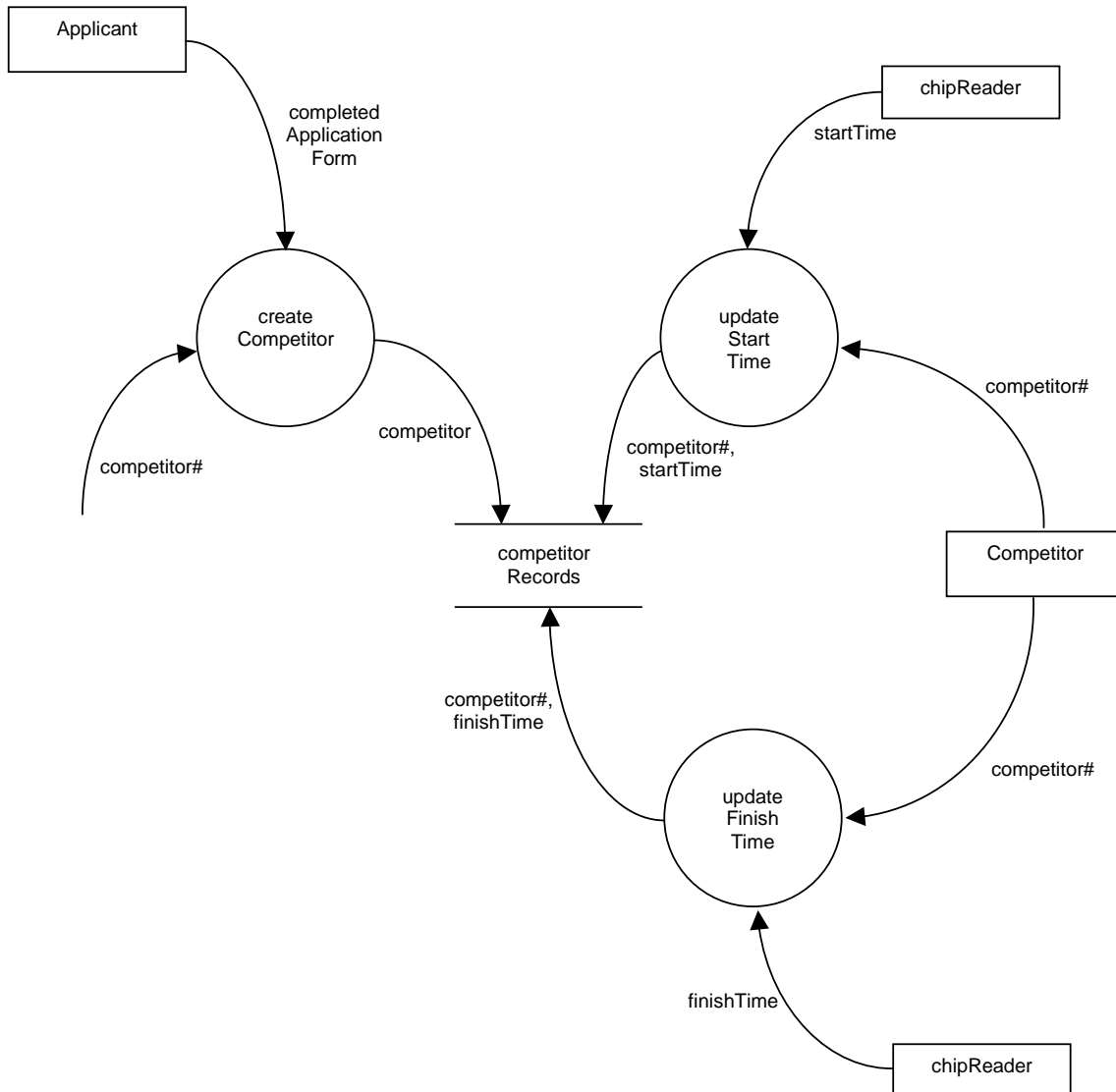
16.1 Rich Picture



Marathon Application and Results System (MARS)

An applicant completes an application form and sends it to the race organisers. The organisers determine which category (elite, charity or club) the applicant falls into, creates a new competitor record and issues a competitor number and a chip to the applicant (who is now an official competitor). The competitor runs the race and their competitor number, start and finish times are read by chip readers which update the competitor's record.

16.2 Data Flow Diagram



Marathon Application and Results System (MARS)

An applicant fills in an application form. Details from the form, together with a competitor number and a decision on competitor's category, forms a competitor record; the record is added to the competitorRecords file. The competitor passes over sensors that read the competitor number from his or her chip, and that, together with the competitors start and finish times update his or her record.

16.3 Entity-Relationship Diagram

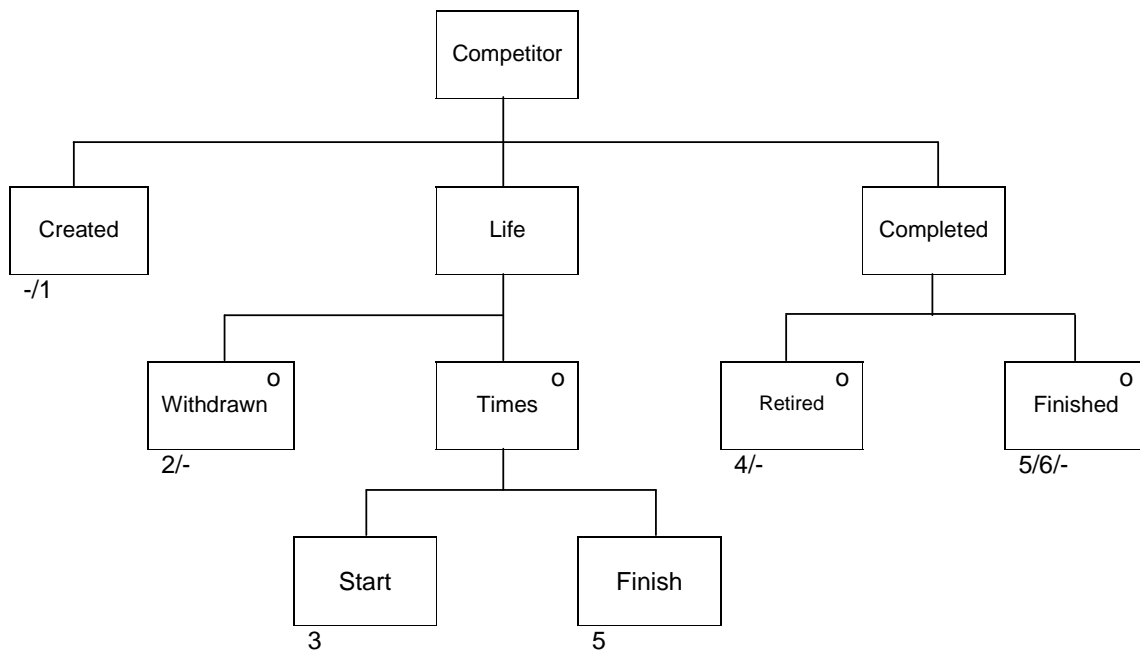


A Competitor has just one Number and a Number is for just one Competitor. A Competitor has two times (start and finish). Several Competitors may share a Time. A time is a start time, or a finish time, or a time in between.

16.4 Entity Life History Diagram

A Competitor may be in one of the following states:

- - not yet registered
- 1 registered
- 2 withdrawn
- 3 started
- 4 retired
- 5 completed
- 6 medal awarded
- - registration finished



Status Indicators

- /1 competitor record created
- 2/- withdrawn and registration finished
- 3 started
- 4/- retired and registration finished
- 5/6/- finished and medal awarded and registration finished

16.5 Data Dictionary

Data Dictionary

completedApplicationForm = name
 + dateOfBirth
 + gender
 + address
 + marathonHistory. Used to determine category.
 + club
 + charity

marathonHistory = date
 + location
 + time

name = char(30)

date, dateOfBirth = short Date format e.g. 16May1989
 must be at least 18 on marathon day

gender = char(1) e.g. 'm' or 'f'

location, address = char(50)

club, charity = char(30)

finishTime, startTime, time = hours:minutes:seconds. 24-hour clock.
 Elapsed time = finishTime - startTime

competitorNumber = integer(4) From 1 up to 9999 inclusive.

category = elite or club or charity

status = active or withdrawn or retired or completed

competitorFile = { competitorRecord }
 competitorFile contains zero, one or many competitorRecords

competitorRecord = competitorNumber
 + completedApplicationForm
 + category
 + status
 + startTime
 + finishTime

16.6 Use Cases

Use Case: CreateCompetitor

Purpose: To create a new competitor record

Actor: Race organiser

Main Success Scenario

- 1 system generates next new competitor number
- 2 system prompts for applicant name, dob, gender, address, category, ...
- 3 race organiser enters applicant data
- 4 system creates new competitor record
- 5 exit success

Exceptions

- 3a Duplicate applicant
 - 2a1 exit failure
- 3b Applicant under age
 - 2b1 exit failure

Use Case: WithdrawCompetitor

Purpose: To mark a competitor's record as withdrawn

Actor: Race organiser

Main Success Scenario

- 1 race organiser enters competitor number
- 2 system locates competitor record with the given number
- 3 race organiser confirms withdrawal
- 4 system updates competitor status to withdrawn
- 5 exit success

Exceptions

- 2a Applicant with given number not found
 - 2a1 exit failure

Use Case: UpdateStartTime
Purpose: To amend competitor record with actual start time
Actor: ChipReader

Main Success Scenario

- 1 ChipReader supplies competitorNumber
- 2 system records current time
- 3 system locates record for given competitorNumber
- 4 system amends start time for current competitor record
- 5 exit success

Exceptions

- 3a Competitor with given number not found
 - 3a1 record failure on report file
 - 3a2 exit failure

Use Case: UpdateFinishTime
Purpose: To amend competitor record with actual finish time
Actor: ChipReader

Main Success Scenario

- 1 ChipReader supplies competitorNumber
- 2 system records current time
- 3 system locates record for given competitorNumber
- 4 system amends finish time for current competitor record
- 5 system amends status to completed
- 6 exit success

Exceptions

- 3a Competitor with given number not found
 - 3a1 record failure on report file
 - 3a2 exit failure

- 4a Finish Time precedes Start Time
 - 4a1 record failure on report file
 - 4a2 exit failure

16.7 Test Plans

Test Plan for Use Case: CreateCompetitor

Test Case	Scenario	name	dob	gender	address	expected Result
C1	Success	tom	1Sep1991	m	1 East Row	competitor record created and added to file
C2	Duplicate Applicant	tom	1Sep1991	m	1 East Row	Error: duplicate applicant
C3	Applicant Under Age	tim	1Sep2001	m	1 West Wing	Error: applicant underage

Test Plan for Use Case: WithdrawCompetitor

Test Case	Scenario	competitor Number	expected Result
W1	Success	1	competitor record status marked as withdrawn
W2	Applicant Not found	99999	Error: applicant with given number not found

Test Plan for Use Case: UpdateStartTime

Test Case	Scenario	competitor Number	time	expected Result
ST1	Success	1	10:01:02	record for competitor with given number amended with the given start time
ST2	Applicant Not found	99999	10:01:03	Error: record for competitor with given number not found recorded on error file

Test Plan for Use Case: UpdateFinishTime

Test Case	Scenario	competitor Number	time	expected Result
FT1	Success	1	12:01:02	record for competitor with given number amended with the given finish time
FT2	Applicant Not found	99999	12:01:03	Error: record for competitor with given number not found recorded on error file
FT3	Time Error	1	10:00:00	Error: finish time before start time recorded on error file

16.8 Hardware

Two computer systems running in parallel. If one system fails, the other carries on processing.

Item	Purpose	£
2 Dell Application Servers running in parallel	race timing	6000.00
1 Dell Application Server	web server	3000.00
10 Dell Optiplex	work stations	6200.00
2 Hewlett Packard Printers	monochrome printing	1250.00
3000 chips for 2500 competitors	timing - one per competitor	??.??
28 chip readers	timing - one per mile	??.??

16.9 Software

Item	Purpose	£
Linux	Multi-user Operating system	??.??
Timing	read and transmit competitor chips	??.??
Oracle	Competitor Database Management	??.??
Open Office Office Suite	word processing, spreadsheets, ...	0.00
Website	For online applications & information	5000.00

16.10 Specialist Staff

- Network Manager with Linux/Unix experience £40000 pa
- Database Manager with Oracle experience £35000 pa
- Website Designer £30000 pa
- 3 Computer specialist support staff £25000 pa each

16.11 Application Form

City Marathon 2008	
Name	<input type="text"/>
Date of Birth	<input type="text"/>
Male or Female	<input type="text"/>
Address	<input type="text"/> <input type="text"/>
Post Code	<input type="text"/>
Phone Number	<input type="text"/>
e-mail Address	<input type="text"/>
Club ¹	<input type="text"/>
Charity ²	<input type="text"/>
Elite ³	<input type="text"/>

Notes

1. Club - leave blank if not running for a club
2. Charity - leave blank if not running for a charity
3. Elite - have completed a marathon in the past 12 months within a time of 2 hours 30 minutes (men) or 3 hours 0 minutes (women). Evidence, such as results slip, needed.

16.12 Results Slip

City Marathon 2008 - Result Slip

Name	<input type="text"/>
Date of Birth	<input type="text"/>
Male or Female	<input type="text"/>
Time	<input type="text"/>

16.13 Results Lists

Result List - Men

Position	Number	Name	Club	Time
1	5	Mr Lel, Martin		2:07:41
2	20	Mr Goumri, Abderrahim		2:07:44
3	1	Mr Limo, Felix		2:07:47
4	7	Mr Gharib, Jaquad		2:07:54
5	6	Mr Ramaala, Hendrick		2:07:56
...

Result List - Women

Position	Number	Name	Club	Time
1	102	Ms Zhou, Chunxiu		2:20:38
2	106	Ms Wami, Gete		2:21:45
3	105	Ms Tomescu-Dita, Constantina		2:23:55
4	111	Ms Kosgei, Salina		2:24:13
5	108	Ms Kiplagat, Lornah		2:24:46
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Bibliography

<http://www.london-marathon.co.uk/> accessed 30 Dec 2007

<http://www.dell.co.uk> accessed 31 Dec 2007

<http://www.openoffice.org/> accessed 31 Dec 2007