

Solution to Exercise 10: Principles of a relational database

Key Point(s):

- The two files must have a common identifying field. In the check file this field must be KEY UNIQUE at Level 1 and Key at Level 2.
- At the appropriate point in the check file at Level 1, a RELATE command must be entered, making the relation to Level 2.

Tasks:

- o Start with the A_EX09.* triplet and save it as A_EX10_LAB.* triplet
- o Use the PATREG.* triplet as the start for the related file set

Solution

- o Start with the A_EX09.* triplet and save it as A_EX10_LAB.* triplet
- o Use the PATREG.* triplet as the start for the related file set.

The A_EX10_LAB.QES data entry form:

This is the questionnaire for the laboratory register

Calculated dates displayed in Day-Month-Year format

labcode	Laboratory code	<input type="text"/>	
idcode	Laboratory identifier	<input type="text"/>	
regextc	Exact registration date	<input type="text"/>	Set to 01/01/1800 if any unknown
regappr	Approximate registration date	<input type="text"/>	Set to 01/01/1800 if year unknown
regqual	Quality of registration date	<input type="text"/>	
seconds	Number of seconds	<input type="text"/>	

labname	Laboratory name	<input type="text"/>	
regdd	Day of registration	<input type="text"/>	Enter 99 if not recorded
regmm	Month of registration	<input type="text"/>	Enter 99 if not recorded
regyy	Year of registration	<input type="text"/>	Enter 9999 if not recorded
serno	Laboratory serial number	<input type="text"/>	Assign 9001,9002,... if not unique (write note (F5))
sex	Examinee's sex	<input type="text"/>	
age	Examinee's age	<input type="text"/>	Enter 999 if not recorded
reason	Examination reason	<input type="text"/>	
res1	Result of specimen 1	<input type="text"/>	
res2	Result of specimen 2	<input type="text"/>	
res3	Result of specimen 3	<input type="text"/>	
endlab	Close lab register record	<input type="text"/>	

The A_EX10_LAB.CHK file

```
LABELBLOCK
  LABEL label_sex
    1 Female
    2 Male
    9 "No sex recorded"
  END
  LABEL label_reason
    0 Diagnosis
    8 "Follow-up, month not stated"
    9 "Reason not stated"
    1 "Follow-up at 1 month"
    2 "Follow-up at 2 months"
    3 "Follow-up at 3 months"
    4 "Follow-up at 4 months"
    5 "Follow-up at 5 months"
    6 "Follow-up at 6 months"
    7 "Follow-up at 7 months or later"
  END
  LABEL label_result
    0.0 Negative
    1.0 "1+ positive"
    2.0 "2+ positive"
    3.0 "3+ positive"
    9.0 "No result recorded"
    4.0 "Positive, not quantified"
    5.0 "Scanty, not quantified"
    0.1 "Scanty, 1 AFB per 100 fields"
    0.2 "Scanty, 2 AFB per 100 fields"
    0.3 "Scanty, 3 AFB per 100 fields"
    0.4 "Scanty, 4 AFB per 100 fields"
    0.5 "Scanty, 5 AFB per 100 fields"
    0.6 "Scanty, 6 AFB per 100 fields"
    0.7 "Scanty, 7 AFB per 100 fields"
    0.8 "Scanty, 8 AFB per 100 fields"
    0.9 "Scanty, 9 AFB per 100 fields"
  END
  LABEL label_endlab
    1 "This ends data entry"
  END
END

BEFORE FILE
  DEFINE regddTemp ##
  DEFINE regmmTemp ##
  DEFINE regyyTemp ####
  DEFINE StartTime #####.#####
END

BEFORE RECORD
  StartTime=now
END

labcode
  NOENTER
END

idcode
  KEY UNIQUE 1
  NOENTER
END

regexct
  NOENTER
END

regappr
  NOENTER
END

regqual
  NOENTER
END

seconds
```

```

NOENTER
END

labname
COMMENT LEGAL a_ex07_namecode.rec SHOW
MUSTENTER
TYPE COMMENT labcode
END

regdd
MUSTENTER
END

regmm
MUSTENTER
REPEAT
END

regyy
RANGE 2000 2004
LEGAL
9999
END
MUSTENTER
REPEAT
AFTER ENTRY
regddTemp=regdd
regmmTemp=regmm
regyyTemp=regyy
IF (regdd=99) or (regmm=99) or (regyy=9999) THEN
regexct="01/01/1800"
ELSE
regexct=date(regdd,regmm,regyy)
regqual=3
ENDIF
IF regdd=99 THEN
regddTemp=15
regqual=2
ENDIF
IF regmm=99 THEN
regddTemp=01
regmmTemp=07
regqual=1
ENDIF
regappr=date(regddTemp,regmmTemp,regyyTemp)
IF regyy=9999 THEN
regappr="01/01/1800"
regqual=0
ENDIF
END
END

serno
MUSTENTER
AFTER ENTRY
idcode=labcode+"-"+regyy+"-"+serno
END
END

sex
COMMENT LEGAL USE label_sex SHOW
MUSTENTER
TYPE COMMENT
END

age
RANGE 0 125
LEGAL
999
END
MUSTENTER
END

reason
COMMENT LEGAL USE label_reason SHOW
MUSTENTER
TYPE COMMENT

```

```

END

res1
  COMMENT LEGAL USE label_result SHOW
  MUSTENTER
  TYPE COMMENT
END

res2
  COMMENT LEGAL USE label_result SHOW
  MUSTENTER
  TYPE COMMENT
END

res3
  COMMENT LEGAL USE label_result SHOW
  MUSTENTER
  TYPE COMMENT
  AFTER ENTRY
    HELP "Do you want to go to the case register?\n y: yes\n n: no" KEYS="YN"
TYPE=CONFIRMATION
  IF RESULTLETTER="N" THEN GOTO endlab
  ELSE
    IF RESULTLETTER="Y" THEN
      RELATE idcode a_ex10_case.rec 1
    ENDIF
  ENDIF
END
END

endlab
  COMMENT LEGAL USE label_endlab SHOW
  MUSTENTER
  TYPE COMMENT
  AFTER ENTRY
    IF seconds=. THEN
      seconds=(now-StartTime)*86400
    ENDIF
  GOTO WRITE
END
END

AFTER RECORD
  IF idcode=. THEN
    HELP "Core information missing:\n      LABNAME, SERNO, and REGDATE\n must all be available"
  TYPE=WARNING
  GOTO labname
  ENDIF
END

```

The A_EX10_CASE.QES data entry form:

Tuberculosis Patient Register

Calculated dates displayed in Day-Month-Year format

idcode	Laboratory unique identifier	<input type="text"/>		
idcase	Case identifier	<input type="text"/>		
reg2exct	Precise date of registration	<input type="text"/>	set to 01/01/9999 if any	unknown
reg2appr	Approximated date of registration	<input type="text"/>	set to 01/01/9999 if year	unknown
reg2qual	Quality of registration date	<input type="text"/>		
startexct	Precise date of treatment start	<input type="text"/>	set to 01/01/9999 if any	unknown
startappr	Approximated date of treatment start	<input type="text"/>	set to 01/01/9999 if year	unknown
startqual	Quality of treatment start date	<input type="text"/>		
outexct	Precise date of treatment outcome	<input type="text"/>	set to 01/01/9999 if any	unknown
outappr	Approximated date of treatment outcome	<input type="text"/>	set to 01/01/9999 if year	unknown
outqual	Quality of outcome date	<input type="text"/>		

unit	Unit identification code	<input type="text"/>		
caseno	BMU register number	<input type="text"/>		
reg2dd	Day of registration	<input type="text"/>	Enter 99 if unknown	
reg2mm	Month of registration	<input type="text"/>	Enter 99 if unknown	
reg2yy	Year of registration	<input type="text"/>	Enter 9999 if unknown	
sex	Sex of patient	<input type="text"/>		
age	Age in years	<input type="text"/>	enter 999 if unknown	
startdd	Day of treatment start	<input type="text"/>	enter 99 if unknown	
startmm	Month of treatment start	<input type="text"/>	enter 99 if unknown	
startyy	Year of treatment start	<input type="text"/>	enter 9999 if unknown	
regimen	Intensive phase of treatment regimen	<input type="text"/>		
site	Predominant disease site	<input type="text"/>		
category	Category of patient	<input type="text"/>		
sm00	Smear result at 0 months	<input type="text"/>		
sm02	Smear result at 2 months	<input type="text"/>		
sm05	Smear result at 5 months	<input type="text"/>		
sm07	Smear result at end of tx	<input type="text"/>		
outdd	Day of treatment outcome	<input type="text"/>	enter 99 if unknown	
outmm	Month of treatment outcome	<input type="text"/>	enter 99 if unknown	
outyy	Year of treatment outcome	<input type="text"/>	enter 9999 if unknown	
outcome	Treatment outcome	<input type="text"/>		
hiv	HIV testing provided	<input type="text"/>		
cpt	Cotrimoxazole treatment	<input type="text"/>		
art	Antiretroviral treatment	<input type="text"/>		

The A_EX10_CASE.CHK file:

```

LABELBLOCK
  LABEL label_caseinreg
    0 "Not a registered case"
    1 "Registered as case"
  END
  LABEL label_unit
    01 Bindura
    02 Awuna
    03 Birchenough
    04 "Ganda Chivua"
  END
  LABEL label_sex
    1 Female
    2 Male

```

```

    9 "Sex not recorded"
END
LABEL label_regimen
    1 EHRZ
    2 SEHRZ
    9 "Regimen not recorded"
END
LABEL label_site
    1 Pulmonary
    2 Extrapulmonary
    9 "No site recorded"
END
LABEL label_category
    1 New
    2 Relapse
    3 "Treatment after failure"
    4 "Treatment after default"
    5 "Transfer in"
    6 Other
    9 "No category recorded"
END
LABEL label_lab
    0.0 Negative
    1.0 "1+ positive"
    2.0 "2+ positive"
    3.0 "3+ positive"
    9.0 "No result recorded"
    4.0 "Positive, not quantified"
    5.0 "Scanty, not quantified"
    0.1 "Scanty, 1 AFB per 100 fields"
    0.2 "Scanty, 2 AFB per 100 fields"
    0.3 "Scanty, 3 AFB per 100 fields"
    0.4 "Scanty, 4 AFB per 100 fields"
    0.5 "Scanty, 5 AFB per 100 fields"
    0.6 "Scanty, 6 AFB per 100 fields"
    0.7 "Scanty, 7 AFB per 100 fields"
    0.8 "Scanty, 8 AFB per 100 fields"
    0.9 "Scanty, 9 AFB per 100 fields"
END
LABEL label_outcome
    1 Cure
    2 Completion
    3 Failure
    4 Default
    5 Death
    6 "Transfer out"
    9 "No outcome recorded"
END
LABEL label_hiv
    1 "P: HIV positive"
    2 "N: HIV negative"
    3 "I: HIV indeterminate"
    4 "ND: HIV test not done"
    9 "HIV result not recorded"
END
LABEL label_cpt
    1 "Receives CPT"
    2 "Does not receive CPT"
    9 "CPT use not recorded"
END
LABEL label_art
    1 "Receives ART"
    2 "Does not receive ART"
    9 "ART use not recorded"
END
END
BEFORE FILE

```

```

DEFINE reg2yyTemp #####
DEFINE reg2mmTemp ##
DEFINE reg2ddTemp ##
DEFINE startyyTemp #####
DEFINE startmmTemp ##
DEFINE startddTemp ##
DEFINE outyyTemp #####
DEFINE outmmTemp ##
DEFINE outddTemp ##
END

idcode
  KEY 1
  NOENTER
END

idcase
  KEY UNIQUE 2
  NOENTER
END

reg2exct
  NOENTER
END

reg2appr
  NOENTER
END

reg2qual
  NOENTER
END

startexct
  NOENTER
END

startappr
  NOENTER
END

startqual
  NOENTER
END

outexct
  NOENTER
END

outappr
  NOENTER
END

outqual
  NOENTER
END

unit
  COMMENT LEGAL USE label_unit SHOW
  MUSTENTER
  TYPE COMMENT
END

caseno
  MUSTENTER
END

reg2dd

```

```

RANGE 1 31
LEGAL
  99
END
MUSTENTER
END

reg2mm
RANGE 1 12
LEGAL
  99
END
MUSTENTER
REPEAT
END

reg2yy
RANGE 2000 2004
LEGAL
  9999
END
MUSTENTER
REPEAT
AFTER ENTRY
  IF (reg2dd=99) or (reg2mm=99) or (reg2yy=9999) THEN
    reg2exct="01/01/9999"
  ELSE
    reg2exct=date(reg2dd,reg2mm,reg2yy)
    reg2qual=3
  ENDIF
  reg2ddTemp=reg2dd
  reg2mmTemp=reg2mm
  reg2yyTemp=reg2yy
  IF reg2dd=99 THEN
    reg2ddTemp=15
    reg2qual=2
    IF reg2mm=99 THEN
      reg2mmTemp=07
      reg2ddTemp=01
      reg2qual=1
    ENDIF
  ENDIF
  reg2appr=date(reg2ddTemp,reg2mmTemp,reg2yyTemp)
  IF reg2yy=9999 THEN
    reg2appr="01/01/9999"
    reg2qual=0
  ENDIF
  idcase=unit+"-"+reg2yy+"-"+caseno
END
END

sex
COMMENT LEGAL USE label_sex SHOW
MUSTENTER
END

age
MUSTENTER
END

startdd
RANGE 1 31
LEGAL
  99
END
MUSTENTER
END

```

```

startyy
  RANGE 2000 2004
  LEGAL
    9999
  END
  COMMENT LEGAL USE label_regimen
  MUSTENTER
  REPEAT
  AFTER ENTRY
    IF (startdd=99) or (startmm=99) or (startyy=9999) THEN
      startexct="01/01/9999"
    ELSE
      startexct=date(startdd,startmm,startyy)
      startqual=3
    ENDIF
    startddTemp=startdd
    startmmTemp=startmm
    startyyTemp=startyy
    IF startdd=99 THEN
      startddTemp=15
      startqual=2
      IF startmm=99 THEN
        startmmTemp=07
        startddTemp=01
        startqual=1
      ENDIF
    ENDIF
    startappr=date(startddTemp,startmmTemp,startyyTemp)
    IF startyy=9999 THEN
      startappr="01/01/9999"
      startqual=0
    ENDIF
  END
END

regimen
  COMMENT LEGAL USE label_regimen SHOW
  MUSTENTER
  TYPE COMMENT
END

site
  COMMENT LEGAL USE label_site SHOW
  MUSTENTER
  TYPE COMMENT
END

category
  COMMENT LEGAL USE label_category SHOW
  MUSTENTER
  TYPE COMMENT
END

sm00
  COMMENT LEGAL USE label_lab SHOW
  MUSTENTER
  TYPE COMMENT
END

sm02
  COMMENT LEGAL USE label_lab SHOW
  MUSTENTER
  TYPE COMMENT
END

sm05
  COMMENT LEGAL USE label_lab SHOW
  MUSTENTER

```

```

TYPE COMMENT
END

sm07
COMMENT LEGAL USE label_lab SHOW
MUSTENTER
TYPE COMMENT
END

outdd
RANGE 1 31
LEGAL
99
END
MUSTENTER
END

outmm
RANGE 1 12
LEGAL
99
END
MUSTENTER
END

outyy
RANGE 2000 2006
LEGAL
9999
END
MUSTENTER
AFTER ENTRY
outddTemp=outdd
outmmTemp=outmm
outyyTemp=outyy
IF (outdd=99) or (outmm=99) or (outyy=9999) THEN
outexct="01/01/9999"
ELSE
outexct=date(outdd,outmm,outyy)
outqual=3
ENDIF
IF outdd=99 THEN
outddTemp=15
outqual=2
ENDIF
IF outmm=99 THEN
outmmTemp=07
outddTemp=01
outqual=1
ENDIF
outappr=date(outddTemp,outmmTemp,outyyTemp)
IF outyy=9999 THEN
outappr="01/01/9999"
outqual=0
ENDIF
END
END

outcome
COMMENT LEGAL USE label_outcome SHOW
MUSTENTER
TYPE COMMENT
END

hiv
COMMENT LEGAL USE label_hiv SHOW
MUSTENTER
TYPE COMMENT

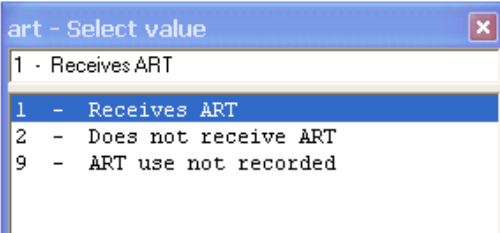
```

END

```
cpt
COMMENT LEGAL USE label_cpt SHOW
MUSTENTER
TYPE COMMENT
END
```

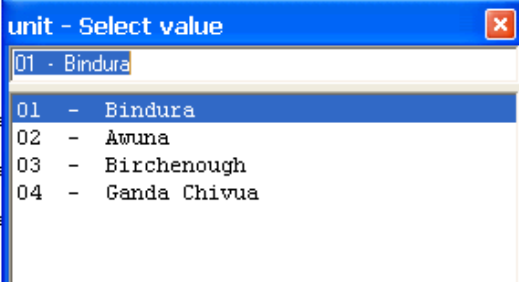
```
art
COMMENT LEGAL USE label_art SHOW
MUSTENTER
TYPE COMMENT
END
```

We noted a problem that we have not (yet) been able to solve: if you skip accessing the child file (by answering “n” to the question in the parent file), then save to disk, and then enter the next laboratory record, and this time access the child file, the cursor goes to the last field:

Year of treatment outcome	<input type="text"/>	ent	
Treatment outcome	<input type="text"/>		
HIV testing provided	<input type="text"/>		
Cotrimoxazole treatment	<input type="text"/>		
Antiretroviral treatment	<input type="text"/>		

rather than to the first.

If you press the ESC key, you get to the right place:

Unit identification code	<input type="text"/>		
BMU register number	<input type="text"/>		
Day of registration	<input type="text"/>	Ente	
Month of registration	<input type="text" value="09"/>	Ente	
Year of registration	<input type="text" value="2000"/>	Ente	
Sex of patient	<input type="text"/>		

and you can start regular entry (the last field stays marked, but this will not influence entry).