```
sQL> start query1-18
SQL> select B#, first_name || ' ' || last_name as name
  2  from students where gpa > 3.5 and deptname = 'CS'
  3  /

B#   NAME
---- ------------------------------
B003 Tracy Wang
B007 Becky Lee
B010 Sata Patel
B011 Art Chang

SQL> start query2-18
SQL> column "birth date" format a10
SQL>
SQL> select t.B#, first_name, last_name, bdate as "birth date"
  2  from tas t, students s where s.deptname = 'CS' and
  3  t.B# = s.B#
  4  /

B#   FIRST_NAME      LAST_NAME       birth date
---- --------------- --------------- ----------
B005 Jack            Smith           18-OCT-91
B010 Sata            Patel           12-OCT-90
B011 Art             Chang           08-JUN-89

SQL> start query3-18
SQL> column classid format a7
SQL>
SQL> select classid, dept_code || course# as course_id,
  2  first_name || ' ' || last_name as name, email
  3  from classes, tas t, students s
  4  where ta_level = 'PhD' and ta_B# = t.B#
  5  and t.B# = s.B#;

CLASSID COURSE_ID                                  NAME                           EMAIL
------- ---------------------------------------- ------------------------------
--------------------
c0006   CS532                                      Art Chang
chang@bu.edu
c0002   Math314                                    Tara Ramesh
ramesh@bu.edu

SQL>
SQL> start query4-18
SQL> select B#, first_name, last_name, gpa
  2  from students where B# in (select B#
  3  from enrollments e1, classes c1
  4  where e1.classid = c1.classid and c1.dept_code = 'CS')
  5  and B# in (select B#
  6  from enrollments e2, classes c2
  7  where e2.classid = c2.classid and c2.dept_code = 'Math');

B#   FIRST_NAME      LAST_NAME              GPA
```

```
---- --------------- --------------- ----------
B001 Anne            Broder                3.17

SQL>
SQL>
SQL>
SQL>
SQL>
SQL>
SQL>
SQL> start query5a-18
SQL> select B#, first_name, last_name from students
  2  where B# in (select B# from enrollments) and
  3  B# not in (select B# from enrollments
  4  where lgrade = 'A');

B#   FIRST_NAME      LAST_NAME
---- --------------- ---------------
B004 Barbara         Callan
B002 Terry           Buttler
B005 Jack            Smith

SQL>
SQL> start query5b-18
SQL> select B#, first_name, last_name from students s
  2  where B# in (select B# from enrollments) and
  3  not exists (select * from enrollments
  4  where B# = s.B# and lgrade = 'A');

B#   FIRST_NAME      LAST_NAME
---- --------------- ---------------
B004 Barbara         Callan
B002 Terry           Buttler
B005 Jack            Smith

SQL>
SQL> start query6-18
SQL> select B#, first_name, last_name from students s
  2  where B# in (select B# from enrollments) and
  3  not exists (select * from enrollments
  4  where B# = s.B# and lgrade <> 'A' and lgrade is not null);

B#   FIRST_NAME      LAST_NAME
---- --------------- ---------------
B006 Terry           Zillman
B007 Becky           Lee

SQL>
SQL> start query6b-18
SQL> select B#, first_name, last_name
  2  from students where B# in
  3  (select B# from enrollments group by B#
  4  having max(lgrade) = 'A');

B#   FIRST_NAME      LAST_NAME
```

```
---- --------------- ---------------
B007 Becky           Lee
B006 Terry           Zillman

SQL>
SQL> column dept_code format a9
SQL> start query7-18
SQL> select classid, dept_code, course#, limit - class_size as seats_available
  2  from classes where course# < 500 and year = 2017 and
  3  semester = 'Spring';

CLASSID DEPT_CODE    COURSE# SEATS_AVAILABLE
------- --------- ---------- ---------------
c0005   CS               240               1
c0001   CS               432               1
c0007   Math             221               0

SQL>
SQL> start query8-18
SQL> select B#, sum(credits)
  2  from enrollments e, classes c, course_credit cc
  3  where e.classid = c.classid and c.course# = cc.course#
  4  group by B#;

B#   SUM(CREDITS)
---- ------------
B003           12
B007            4
B002            4
B004            8
B005            3
B006            3
B001           23

7 rows selected.

SQL>
SQL> start query9-18
SQL> select dept_code, course# from classes
  2  group by dept_code, course# having sum(class_size) =
  3  (select max(sum(class_size)) from classes group by dept_code, course#);

DEPT_CODE    COURSE#
--------- ----------
CS               432

SQL>
SQL> start query10-18
SQL> select s.B#, first_name, last_name, count(*)
  2  from students s, enrollments e
  3  where s.B# = e.B#
  4  group by s.B#, first_name, last_name
  5  having count(*) >= 2;

B#   FIRST_NAME      LAST_NAME         COUNT(*)
```

```
---- --------------- --------------- ----------
B001 Anne            Broder                   6
B003 Tracy           Wang                     3
B004 Barbara         Callan                   2

SQL>
SQL> start query11-18
SQL> select classid, dept_code, course# from classes c where not exists
  2  (select * from students s where status = 'junior' and not exists
  3  (select * from enrollments e where c.classid = e.classid and e.B# = s.B#));

CLASSID DEPT_CODE    COURSE#
------- --------- ----------
c0005   CS               240
c0004   CS               432

SQL>
SQL> start query12-18
SQL> select B#, first_name, last_name from students s where not exists
  2  (select * from classes c where c.dept_code = 'CS' and
  3  year = 2017 and semester = 'Spring' and not exists
  4  (select * from enrollments e
  5  where s.B# = e.B# and e.classid = c.classid));

B#   FIRST_NAME      LAST_NAME
---- --------------- ---------------
B001 Anne            Broder

SQL>
SQL> start query13-18
SQL> select B#, first_name, last_name from students s
  2  where exists (select * from enrollments e, classes c
  3  where s.B# = e.B# and e.classid = c.classid and s.deptname <> c.dept_code);

B#   FIRST_NAME      LAST_NAME
---- --------------- ---------------
B001 Anne            Broder
B004 Barbara         Callan
B006 Terry           Zillman
B007 Becky           Lee

SQL>
SQL> start query14-18
SQL> select B#, first_name, last_name from students s
  2  where B# in (select B# from enrollments) and (B#, first_name, last_name) not in
  3  (select B#, first_name, last_name from students s
  4  where exists (select * from enrollments e, classes c
  5  where s.B# = e.B# and e.classid = c.classid and s.deptname <> c.dept_code));

B#   FIRST_NAME      LAST_NAME
---- --------------- ---------------
B002 Terry           Buttler
B003 Tracy           Wang
B005 Jack            Smith
```

```
SQL>
SQL> start query15-18
SQL> select c.dept_code, c.course#, c.title,
  2  nvl(e.lgrade, 'grade missing') as grade
  3  from courses c, classes c1, enrollments e where c.dept_code = c1.dept_code
  4  and c.course# = c1.course# and e.B# = 'B003' and c1.classid = e.classid;

DEPT_CODE    COURSE# TITLE                GRADE
--------- ---------- -------------------- -------------
CS               432 database systems     I
CS               432 database systems     A
CS               240 data structure       grade missing

SQL>
SQL> start query16-18
SQL> select c.dept_code, c.course#, c.title from courses c, classes c1
  2  where c.title like '%systems%' and c.dept_code = c1.dept_code
  3  and c.course# = c1.course# and not exists
  4  (select * from students s where s.gpa = 4.0 and not exists
  5  (select * from enrollments e where e.B# = s.B# and e.classid = c1.classid));

no rows selected

SQL>
SQL> column classid format a7
SQL> column lgrade format a6
SQL> start query17-18
SQL> select B#, classid, lgrade, decode(lgrade, 'A', 4, 'A-', 3.7, 'B+',
  2  3.3, 'B', 3, 'B-', 2.7, 'C+', 2.3, 'C', 2, 'C-', 1.7, 'D', 1) ngrade
  3  from enrollments where lgrade is not null and lgrade <> 'I'
  4  order by ngrade desc;

B#   CLASSID LGRADE     NGRADE
---- ------- ------ ----------
B001 c0001   A               4
B006 c0006   A               4
B001 c0004   A               4
B007 c0007   A               4
B003 c0004   A               4
B004 c0005   B+            3.3
B005 c0006   B               3
B001 c0005   B               3
B001 c0003   B               3
B002 c0002   B               3
B001 c0006   B-            2.7
B001 c0002   C+            2.3
B004 c0004   C               2

13 rows selected.

SQL>
SQL> start query18-18
SQL> select B#, first_name, last_name from students where B# in
  2  (select e.B# from enrollments e, classes c
  3  where e.classid = c.classid and (dept_code, course#) in
```

```
  4  (select c1.dept_code, c1.course# from classes c1, enrollments e1
  5   where e1.B# = 'B005' and c1.classid = e1.classid));

B#   FIRST_NAME      LAST_NAME
---- --------------- ---------------
B005 Jack            Smith
B006 Terry           Zillman
B001 Anne            Broder

SQL>
SQL> start query18a-18
SQL> select B#, first_name, last_name from students s where exists
  2  (select e.* from enrollments e, classes c
  3  where s.B# = e.B# and e.classid = c.classid and exists
  4  (select c1.* from classes c1, enrollments e1
  5  where c.dept_code = c1.dept_code and c.course# = c1.course#
  6  and e1.B# = 'B005' and c1.classid = e1.classid));

B#   FIRST_NAME      LAST_NAME
---- --------------- ---------------
B005 Jack            Smith
B006 Terry           Zillman
B001 Anne            Broder

SQL>
SQL> start query19-18
SQL> select avg(temp.totalcredits) from (select e.B#, sum(cc.credits) totalcredits
  2  from enrollments e, courses c, course_credit cc, classes c1
  3  where e.classid = c1.classid and c.course# = cc.course# and
  4  c.dept_code = c1.dept_code and c.course# = c1.course#
  5  and lgrade is not null group by e.B#) temp;

AVG(TEMP.TOTALCREDITS)
----------------------
            7.57142857

SQL>
SQL> column deptname format a8
SQL> start query20-18
SQL>
SQL> select deptname, avg(temp.totalcredits) average_total_credits
  2  from students s, (select e.B#, sum(cc.credits) totalcredits
  3  from enrollments e, courses c, course_credit cc, classes cl
  4  where e.classid = cl.classid and c.course# = cc.course# and
  5  c.dept_code = cl.dept_code and c.course# = cl.course# and lgrade is not null
  6  group by e.B#) temp where s.B# = temp.B# group by deptname;

DEPTNAME  AVERAGE_TOTAL_CREDITS
--------- ---------------------
Biol                         3
CS                         9.5
Math                         6

SQL>
SQL> spool off
```