# Answers to SQL Problem Sheet 1

1. 
```
select table_name
from user_tables;
```

2. 
```
describe emp
```

3. 
```
select *
from emp;
```

4. 
```
select deptno, dname
from dept;
```

5. 
```
insert into dept
values (50, 'PENSIONS', 'CHICAGO');
```

6. 
```
insert into dept (deptno, dname)
values (60, 'CONTRACTS');
```

7. 
```
select *
from emp
where deptno = 30;
```

8. 
```
select *
from emp
where job = 'MANAGER'
and sal > 2500;
```

9. 
```
select ename, job, deptno
from emp
where job = 'MANAGER'
and deptno != 30;
```

10. 
```
select ename, sal
from emp
where sal between 1200 and 1400;
```

11. 
```
select *
from dept
where deptno in (10,30);
```

12. 
```
select ename
from emp
where ename like '_ _ R %';
```

# Answers to SQL Problem Sheet 2

1. 
```
select sal, job, ename
from emp
where deptno = 30
order by sal;
```

2. 
```
select sal, job, ename
from emp
order by job, sal desc;
```

3. 
```
select distinct job
from emp;
```

4. 
```
select ename, deptno
from emp
where ename = 'ADAMS';
```

5. 
```
select loc
from dept
where deptno = 20;
```

6. 
```
select ename, loc
from emp, dept
where ename = 'ADAMS'
and emp.deptno = dept.deptno;
```

7. 
```
select ename, sal, comm, sal + comm
from emp
where job = 'SALESMAN';
```

8. 
```
select ename, job, to_char(hiredate,'DY DD MM YYYY')hiredate
from emp
where deptno = 20;
```

9. 
```
select empno, ename, job, emp.deptno, loc
from emp, dept
where emp.deptno = dept.deptno;
```

   Note: As department number appears in both emp and dept you need to say which table Oracle should take the department number from. Otherwise you will get a ‘column ambiguously defined’ error.

10. 
```
select deptno, max(sal)
from emp
group by deptno;
```

# Answers to SQL Problem Sheet 3

1. 
```
select dname, job, sum(sal), count(*), avg(sal)
from emp, dept
where emp.deptno = dept.deptno
group by dname, job;
```

2. 
```
select dname, job, sum(sal), count(*), avg(sal)
from emp, dept
where emp.deptno = dept.deptno
group by dname, job
having count(*) >= 2;
```

3. 
```
select ename, job
from emp
where job in (select job
      from emp
      where ename = 'JONES');
```

4. 
```
select ename, sal
from emp
where sal > ( select avg(sal)
from emp);
```

5. 
```
update emp
set sal = sal + 100
where job = 'CLERK' ;
```

6. 
```
create table promotion as
select ename, job, sal, comm
from emp
where comm > 0.25 * sal ;
```

7. 
```
delete from dept
where deptno = 50 ;
```

8. 
```
create view emp10 as
select empno, ename, job
from emp
where deptno = 10
with check option ;
```

9. 
```
insert into EMP10
values (20, 'BAILEY', 'MANAGER');
```
The problem with this command is caused by the updating restrictions on views caused by the WITH CHECK command.

10. 
```
select *
from emp10 ;
```

# Answers to SQL Problem Sheet 4

1. 
```
create table proj ( projno number (3) not null,
      pname char (5) ,
      budget number (7,2) ) ;
```

2. 
```
insert into proj values (101, 'ALPHA', 96000 ) ;
insert into proj values (102, 'BETA',  82000) ;
insert into proj values (103, 'GAMMA', 15000 ) ;
```

3. 
```
select *
from proj ;
```

4. 
```
alter table emp
add ( projno number (3) ) ;

describe emp;
```

5. 
```
update emp
set projno = 101
where deptno = 20
or job = 'SALESMAN' ;
```

6. 
```
update emp
set projno = 102
where projno is null ;
```

7. 
```
select ename, job, deptno, pname
from emp, proj
where emp.projno = proj.projno ;
```

8. 
```
alter table proj
modify budget number (8,2) ;
```

9. 
```
update proj
set budget = 105000
where projno = 103 ;
```

10. 
```
select empno, ename, emp.deptno, loc, pname, budget
from emp, dept, proj
where emp.deptno = dept.deptno and
emp.projno = proj.projno ;
```

# Answers to SQL Problem Sheet 5

1. create view personnel as select ename, job, pname
   from emp, proj
   where emp.projno = proj.projno ;

2. select *
   from personnel
   where job = 'MANAGER' ;

3. drop view personnel ;

4. describe user_tables ;

   1. select table_name
   from user_tables ;

6. grant select
   on emp
   to adams ;

7. create view emps
   as select empno, ename, job, mgr, hiredate, deptno
   from emp ;

8. Update emp
   set job = ‘MANAGER’,
   sal = sal + 1000,
   deptno = 40
   where comm >= all (select comm. from emp);

9. select ename, dname, pname
   from emp, dept, proj
   where emp.deptno = dept.deptno
   and emp. projno = proj.projno;

10. select empno, ename, emp.deptno, dname, loc, emp.projno, pname, budget
    from emp, dept, proj
    where ename = ‘ADAMS’
    and emp.deptno = dept.deptno
    and emp. projno = proj.projno

# Answers to SQL Problem Sheet 6 (a) – SQL Integrity

1. alter table emp
   add (constraint pk_emp primary key (empno) );

2. insert into emp values (8000, 'JONES', 'CLERK', 0, '12-DEC-99', 1250, 0, 10, 101);

3. insert into emp values (8000, 'SMITH', 'MANAGER', 1890, '10-JAN-99', 1950, 0, 20, 102);
   You will get an Oracle error saying unique constraint (username.pk_emp) violated. This means that an attempt was made to violate or break the unique primary key constraint pk_emp which you set up in problem 1 by inserting a second employee with the same empno as in problem number 2.

4. alter table dept
   add (constraint pk_dept primary key (deptno) );

5. alter table proj
   add (constraint pk_proj primary key (projno) );

6. alter table emp
   add (constraint fk_emp_dept foreign key (deptno)
   references dept ) ;

7. alter table emp
   add (constraint fk_emp_proj foreign key (projno)
   references proj ) ;

8. insert into emp values (8010, 'WALKER', 'CLERK', 0, '12-FEB-99', 2250, 0, 10, 102);

9. insert into emp values (8012, 'BAKER', 'SALESMAN', 0, '15-FEB-99', 2050, 590, 90, 102);
   You will get the following Oracle error: integrity constraint (username.fk_emp_dept) violated – parent key not found. This means that an attempt was made to violate or break the primary/foreign key constraint fk_emp_dept which you set up in problem 6 by inserting an employee into a department that doesn't exist.

10. insert into dept values (90, 'RandD', 'GALWAY');

# Answers to SQL Problem Sheet 6 (b) – SQL Integrity

1. insert into emp values (8012, 'BAKER', 'SALESMAN', 0, '15-FEB-99', 2050, 590, 90, 102);
   This time you should not have any problem inserting the record because department 90 has been added to the dept table.

2. insert into emp values (8115, 'FERRY', 'ANALYST', 0, '19-MAR-99', 1950, 0, 20, 104);
   You will get the following Oracle error: integrity constraint (username.fk_emp_proj) violated – parent key not found. This means that an attempt was made to violate or break the primary/foreign key constraint fk_emp_proj which you set up in problem 7 by inserting an employee into a project that doesn't exist.

3. insert into proj values (104, 'HEAT', 10000);

4. insert into emp values (8115, 'FERRY', 'ANALYST', 0, '19-MAR-99', 1950, 0, 20, 104);
   This time you should not have any problem inserting the record because department 90 has been added to the dept table.

5. delete from dept
   where deptno = 90 ;
   You will get the following Oracle error: integrity constraint (username.fk_emp_dept) violated – child record found. This means that an attempt was made to violate or break the primary/foreign key constraint fk_emp_dept which you set up in problem 7 by deleting a department which still has employees assigned to it. In order to delete from department number 90 you must ensure that there are no employees currently assigned to the department. You may either update employees department numbers to move them to another department or you may delete them. Of course you could also drop the primary/foreign key constraint but this is not recommended.

6. select constraint_name, constraint_type
   from user_constraints;

7. alter table emp
   drop constraint fk_emp_proj ;

8. alter table emp
   add (constraint emp_sal_check check (salary > 500) ) ;

9. insert into emp values (8502, 'HEART', 'ANALYST', 0, '08-MAY-99', 300, 0, 10, 102);
   You will get the following Oracle error: integrity constraint (username.emp_sal_check). This means that an attempt was made to violate or break the constraint emp_sal_check which you set up in problem 18 by inserting an employee with a salary of less than £500.

10. insert into emp values (8502, 'HEART', 'ANALYST', 0, '08-MAY-99', 600, 0, 10, 102);
    This time you should not have any problem inserting the record because salary has been increased to more than £500.

# Answers to SQL Problem Sheet 7 – SQL Security

1. grant select, update // adams is simply an example of what the other persons username might be.
   on emp
   to adams ;

2. select *
   from username.emp; // where username is you own username

3. update username.emp
   set ename = 'FIELDS'
   where empno = 7782 ;

4. a) select *
      from emp;
   b) The change should not be visible yet.
   c) The person who made the change needs to commit it before it becomes visible to another user.
   d) Commit the change using *commit;* and ask the owner of the table to look at the table again. The change should now be visible.

5. grant select
   on emp
   to public ;

6. revoke update
   on emp
   from adams ;

**To be completed after the Database System Security Lecture**

7. create role developer ;

8. grant create table, create view, create procedure to developer ;

9. grant developer to *username*

10. revoke create procedure
    from developer ;

11. create role analyst identified by secure ;

12. grant select on dept to analyst ;

13. grant analyst to username ;

14. set role analyst identified by secure ;

15. select * from username.dept ;

16. drop role developer ;

17. drop role analyst ;