The University of Queensland
School of Information Technology and Electrical Engineering
Semester One, 2012
CSSE2310 / CSSE7231 - Mid-Semester Exam
All calculators are permitted but no communication devices.
Test time is 35minutes, no persual. Choose the single most correct answer.
All questions are worth 1 mark.

1. Which of the following programs can be used to look for the word "spider" in a given file?

   (a) `ls, chmod`
   (b) `less, ls, chmod`
   (c) `ls, less`
   (d) `grep, less`
   (e) `ls, grep, chmod`

2. Assume the environment contains the following:
   ```
   PATH=/bin:/usr/bin
   USER=joel
   ```

   What will be output by the following bash commands:
   ```
   PATH=$path:/opt/bin
   me=USER
   echo "$me path is $PATH"
   ```

   (a) joel path is /bin:/usr/bin:/opt/bin
   (b) USER path is /bin:/usr/bin:/opt/bin
   (c) USER path is :/opt/bin
   (d) joel path is /bin:/usr/bin:/opt/bin
   (e) $me path is $PATH

3. The output from `ls -l` for a file includes the following:
   `-rwxr--rw- 1 me folk`
   Who is allowed to modify the contents of the file?

   (a) me
   (b) me and users in the folk group
   (c) me and users not in folk
   (d) everybody but me
   (e) users in folk but not me

4. Which line in the following function has a compile error or warning under `-Wall -pedantic`?

```
int factorial(int n) {                  /* 1 */
    if (n>1) {                          /* 2 */
        return n*factorial(n-1);        /* 3 */
    } else {                            /* 4 */
        return;                         /* 5 */
    }                                   /* 6 */
}                                       /* 7 */
```

   (a) line 1
   (b) line 2
   (c) line 3
   (d) line 5
   (e) They are all correct.

5. Which of the following will produce a program called `fred`?

   (a) `gcc fred.c`
   (b) `gcc -o fred.c fred`
   (c) `gcc fred.c -c`
   (d) `gcc -o fred fred.c`
   (e) none of the above

6. What are the values of `i` and `j` after the following?

```
int i, j=0;
for (i=0; i<10; ++i) {
    j+=3+i;
}
```

   (a) i==9, j==75
   (b) i==10, j==75
   (c) i==10, j==85
   (d) i==9, j==85
   (e) none of the above

7. Consider the following function:

```
void f(void) {
    int arr[7];
    int* p1=malloc(7*sizeof(int));
    int** p2=malloc(2*sizeof(int*));

    // code removed

}
```

No other allocations are performed. What code would need to be added to the bottom of the function to ensure that all memory allocated by f() is released?

(a) free(p1); free(p2);

(b) free(arr); free(p1); free(p2);

(c) free(p1); free(*p2);

(d) free(p1); free(p2[0]); free(p2[1]);

(e) free(p1); free(*p2); free(p2);

8. What is the value of `a` after the following has executed?

```
int a=1, b=2, c=3;
if ((a==2) || b) {
    a=4;
} else {
    a=0;
}
if (b-c) {
    a=a+3;
} else {
    a=a+10;
}
```

(a) 7

(b) 4

(c) 14

(d) 10

(e) None of the above

9. The following declares a function pointer, how many parameters does the function it would point at require?

```
int * (*fnptr)(void*, void (*)(int*, int*, int*), void* (*)(char*, char*, char*))
```

(a) 2
(b) 3
(c) 4
(d) 6
(e) 7

10. What is output by the following code?

```
int s(int a, int b) {
    a=a & b;
    return a;
}

int main(int argc, char** argv) {
    int a=7, b=8, c=0;
    c=s(a,b);
    printf("%d %d %d\n", a, b, c);
    return 0;
}
```

(a) 7 8 7
(b) 15 8 15
(c) 7 8 0
(d) 0 8 15
(e) 15 8 0

11. What types are the variables declared in the following:

```
char* c, d[][];
long e;
```

(a) c: a string, d: an array of strings, e: long string

(b) c: a string, d: a string, e: long integer

(c) c: a character, d: a string, e: long integer

(d) c: a string, an array of characters, e: long string

(e) the above is not legal C

12. Consider the following loop:

```
for (int i=0;(i==0) || (g(i)!=0);++i) {
    h(i);
}
```

Which of these have exactly the same effect for all functions `f()` and `g()`?

```
int i=0;            // first
while (g(i)!=0) {
    h(i);
    ++i;
}
```

```
int i=0;           // second
do {
    h(i);
    i++;
} while (g(i)!=0);
```

```
int i=0;          // third
while ((i==0) || (g(i)!=0)) {
    h(i);
    i++;
}
```

(a) first

(b) second

(c) third

(d) first and third

(e) second and third

13. Suppose you have edited a file (which is already part of the project) in a working directory. What sequence of commands is required to record those changes in your svn repository?

    (a) svn update
    (b) svn rm, svn add, svn commit
    (c) svn checkout
    (d) svn commit
    (e) svn status

14. What is the purpose of the TLB?

    (a) To speed up page table lookup.
    (b) To allow lecturers to wear hats.
    (c) To allow larger virtual address spaces.
    (d) To allow larger physical address spaces.
    (e) To provide memory protection.

15. Consider the following page table for a system with 4KB pages:

0	invalid
1	4
2	1
3	7
4	2

    Which physical address does virtual address 8191 map to?

    (a) 8191
    (b) 20479
    (c) 28671
    (d) 12287
    (e) None, segfault