These are the types of questions that you will find on the final exam.   I have not included all possible topics, but I have included all possible types of questions. These questions have the same level of difficulty as you will find on the actual final exam.

1.   A _____ is an operator that sends the standard output of one command to the standard input of another command.

2.   The ___ is the part of the operating system that controls the hardware and software.

3.   Name four different environment variables and state what data they contain.

4.   What is the difference between a relative and an absolute pathname?

5.   Name four top-level directories that are always present in ANY UNIX system and describe their purpose in a few words.

6.   From the following set of directory tables, it is possible to construct the tree and fill in the missing entries. Fill in the entries that are missing.

288	.
	..
402	foo
290	bar
100	stuff

	.
288	..
387	dir1
389	dir2

389	.
	..
100	data
402	c

387	.
	..
402	x

7.   Convert the following octal modes to permission strings.

     a. `0654` _____

     b. `0753` _____

8.   Convert the following binary to decimal:

     `10110110011`   _____

9.   Convert the following decimal to binary:

     `753`   _____

10.   (2%) A_____ is a precise and unambiguous procedure for solving a problem in a finite number of steps.

11.   (4%) Name three filters other than grep and describe what they filter.

12.   (4%) What is displayed by the following command, given that `thefile` has the following contents:

```
120  30  2030
7530
30 200 12
10
10 2.3005
 3
$ cat thefile | grep '[^0-9]30'
```

13.   (4%) Write a regular (not extended) `grep` pattern that will find all input lines that end in a string of at least 8 alphanumeric characters.

14.   (4%) Write a `grep` pattern that will match any decimal number less than 100.

15.   (4%) What is output by the following Perl program?

```perl
my $s = 0;
my $i = 1;
while ( $i <= 8 ) {
    $s = $s + $i;
    $i = $i + 1;
}
print "$s\n";
```

16.   (4%) What is printed by the following code fragment:

```perl
my $var = 10;
my $ref = \$var;
my $newref = $ref;
my $x   = $$ref + 1;
$var    = $$newref - 2;
print "\$ref = $ref and \$newref = $newref";
```

17.   Write a function that returns its second argument concatenated to the end of its first argument.

18.   Write the Perl instructions that reads words from standard input and create a hash named `wordlengths` that contains the words as keys and their lengths as values.