For each of the following questions, the answer should be given as a single sequence of piped Unix commands, except of course if a script is explicitly asked for, or if the answer must be given in words.

1. Rewrite the following command by using egrep instead:

   ```
grep '^[\([^\{(ab}\)]\)\{2,4\}]*' filename
   ```

2. Which words of the websters dictionary does this command print out?

   ```
grep '^(.\d)(\d\d)$' websters
   ```

3. An HTML comment correctly parsed by most browsers begins with

   ```
   <!--
   ```

   and does not contain `--` or `>` anywhere in the comment.

   (a) Use `egrep` to find all lines containing an HTML comment in the files of your working directory whose names end with `.html`.

   (b) Use `sed` to replace in each file the comment written using the HTML syntax by the same comment using the syntax of C (that is using `/*` and `*/` for the beginning and end of comment) everywhere except from the last line of a file.

4. The command `yes` of Unix simply prints out `y` on each line, forever.

   For example,

   ```
   $ yes₁head -2
   y
   y
   ```

   What does the following generate?

   ```
   $ yes | head -10 | cat -n | \n   sed -n -e '/1/,'/7/ p -e '/5/,'/9/ p
   ```
5. On `i5`, the command `ps` produces an output such as the following where the fields are tab-separated:

```
F S  UID  PID  PPID  PRI  NI  ADDR  SZ  WCHAN  STIME  TTY  TIME  CMD
0 S  nobody 13280 13269 0  40  20  ?   1197  ?  Aug 12 ?  5:01 /usr/apache/bin/httpd
0 S  nobody 13402 13269 0  98  20  ?   1180  ?  Aug 12 ?  4:14 /usr/apache/bin/httpd
0 S  daemon 13138 13024 0  41  20  ?   335  ?  Aug 12 ?  0:00 /usr/sbin/rpcbind
0 S  nobody 17351 13269 0  40  20  ?   1179  ?  Aug 12 ?  4:47 /usr/apache/bin/httpd
0 S  nobody 13805 13269 0  98  20  ?  14368  ?  Aug 12 ?  11:33 /usr/apache/bin/httpd
0 S  root 13043 13024 0  40  20  ?  1174  ?  Aug 12 ?  4:04 /lib/svc/bin/svc.configd
0 S  mm007 26138 26133 0  98  20  ?   1074  ?  Aug 12 ?  0:00 /usr/lib/sshd
0 S  ssmap 17246 13024 0  98  20  ?   913  ?  Aug 12 ?  0:32 /usr/lib/sendmail -Ac -qt5m
0 S  nobody 13282 13269 0  40  20  ?   1180  ?  Aug 12 ?  4:16 /usr/apache/bin/httpd
```

(a) Write a bash script called `pgrep` that returns the process IDs of the processes whose name matches the regular expression provided as argument (e.g., `pgrep http*`).

(b) Similarly, write a bash script `pkill` that can be used to kill all processes whose name matches the regular expression provided as argument.

(c) Print all user IDs running more than four processes.

(d) Write a bash script that sends email to user IDs other than `nobody` and `root` running more than 20 processes.

(e) `gawk` has a special function, `strftime`, for creating strings based on the current time, e.g.,

```
$ date
Mon Feb 26 13:24:01 EST 2007
$ gawk 'BEGIN{ print strftime("%H")}'
13
$ gawk 'BEGIN{ print strftime("%M")}'
24
```

Use that to show all the processes that have started in the last two hours, assuming that this is not done around midnight.