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CSC220 -- Activity 3
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Part 1: Unix

1. r/w/x permissions define read, write and execute access to files and directories. They are set for specific users and groups and default permissions for all users.
2. To create the three directories, I'd use `mkdir`. To change the permissions of sample, `chmod 740 sample`.

```
faysal@DESKTOP-AOGE5FF:~/220$ ls -l
total 12
-rwxrwxrwx 1 faysal faysal 8519 May 31 19:53 a.out
drwxrwxrwx 2 faysal faysal    0 May 31 20:38 class1
drwxrwxrwx 2 faysal faysal    0 Jun 11 11:17 courses
-rw-rw-rw- 1 faysal faysal  105 May 31 19:49 hello.c
drwxrwxrwx 2 faysal faysal    0 Jun 11 11:17 personal
drwxrwxrwx 2 faysal faysal    0 Jun 11 11:17 sample
-rwx-w---- 1 faysal faysal    0 May 31 19:59 temps.c
faysal@DESKTOP-AOGE5FF:~/220$ chmod 740 sample
faysal@DESKTOP-AOGE5FF:~/220$ ls -l
total 12
-rwxrwxrwx 1 faysal faysal 8519 May 31 19:53 a.out
drwxrwxrwx 2 faysal faysal    0 May 31 20:38 class1
drwxrwxrwx 2 faysal faysal    0 Jun 11 11:17 courses
-rw-rw-rw- 1 faysal faysal  105 May 31 19:49 hello.c
drwxrwxrwx 2 faysal faysal    0 Jun 11 11:17 personal
drwxr----- 2 faysal faysal    0 Jun 11 11:17 sample
-rwx-w---- 1 faysal faysal    0 May 31 19:59 temps.c
```

3. Bash has a process ID of 2 and its parent is /init. The 'ps -AF' command itself has process ID 139 and Bash is its parent. None of these take up any memory according to the listing.

```
faysal@DESKTOP-AOGE5FF:/mnt/c/Users/faysa/Dropbox/School/CSC220/Activity3$ ps -AF
UID        PID  PPID  C    SZ   RSS PSR STIME TTY          TIME CMD
root         1     0  0     0     0   0  2433 ?        00:00:00 /init
faysal       2     1  0     0     0   0  2433 ?        00:00:01 /bin/bash
faysal     139     2  0     0     0   0  2433 ?        00:00:00 ps -AF
```

Part 2

Sample Output

```
faysal@DESKTOP-AOGE5FF:/mnt/c/Users/faysa/Dropbox/School/CSC220/Activity3$ gcc faysalkhatri.c -Wall -ansi -pedantic
faysal@DESKTOP-AOGE5FF:/mnt/c/Users/faysa/Dropbox/School/CSC220/Activity3$ ./a.out
GCD of 10 and 15 is 5
GCD of 80 and 497 is 1
GCD of 99 and 645 is 3

***
Original string: Test   this    string
escape(s): Test\tthis\tstring
***

***
Original string: Hello world of         tabs and new lines

escape(s): Hello world of \ttabs and new lines \n
***

***
Original string: Test more      tabs  and spaces  and new lines
        tab
escape(s): Test more \ttabs  and spaces  and new lines \n\ttab
***
```

act3.h

```
/*
  This header file contians shared declarations of gcd(), remainder() and escape();
*/

int gcd(int x, int y);
int remainder(int x, int y);
void escape(char s[]);
```

act3.c

```
#include <stdio.h>
#include <string.h>

/*
  This file contains gcd(), remainder() and escape() methods.
*/

int gcd(int x, int y) {
  if (y == 0) {
    return x;
  }
  else if (y > 0) {
    return gcd(y, remainder(x, y));
  }
  else {
    return -1;
  }
}

int remainder(int x, int y) {
  return (x % y);
}


void escape(char s[]) {
  int i;
  int length = strlen(s);

  printf("\n***\nOriginal string: %s\n", s);
  printf("escape(s): ");

  for (i=0; i<length; i++) {
    switch (s[i]) {
      case '\n':
        printf ("\\n");
        break;
      case '\t':
        printf ("\\t");
        break;
      default:
        printf ("%c", s[i]);
        break;
    }
  }
  printf("\n***\n");
}
```

faysalkhatri.c

```
#include "act3.h"
#include "act3.c"

/*
  This file is a test driver for gcd(), remainder() and escape().
*/

int main() {
  printf("GCD of %d and %d is %d\n",10, 15, gcd(10, 15));
  printf("GCD of %d and %d is %d\n",80, 497, gcd(80, 497));
  printf("GCD of %d and %d is %d\n",99, 645, gcd(99, 645));

  escape("Test    this  string   ");
  escape("Hello world of      tabs and new lines \n ");
  escape("Test more     tabs  and spaces  and new lines \n  tab");
  return 0;

}
```