

CS3157 – Advanced Programming
Sample Final Examination

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1. (10 pts) Please define in as few sentences as you can. Where ever possible please support your answers with an example if appropriate.

a. operator overloading

b. enum

c. malloc

d. pass by reference

e. gdb

2. (16 pts) Given the program:

```
main()
{
    const int a = 1;
    int b = 2;
    const int *p = &a;
    int * const q = &b;
    int & r = b;
```

// Which of the following statements are legal or not ?
// Explain.

- a. `p = &q;` // (a)
 - b. `*p = 55;` // (b)
 - c. `q = &a;` // (c)
 - d. `q = 55;` // (d)
 - e. `q = p;` // (e)
 - f. `*q = *p;` // (f)
 - g. `*q = a;` // (g)
 - h. `r = a;` // (h)
- ```
}
```

3. (14 pts) What do the following Perl statements do?

a. `substr $seq, 25, 320;`

b. `$sdfd{'hhh'}`

c. `*$a`

d. `join`

e. `foreach $xyz (@abc)`

f. `1 .. 5`

g. `$something::b`

h. `pos`

i. `push`

j. `qw( a b c )`

k. `use BinTree;`

4. (8 pts)
  - a. Describe by creating an appropriate .h file how a two dimensional array can be created as a class. Which operators would be overloaded?

5. (10 pts) Write a complete C++ program that reads characters one at a time until end of file. After it reaches end of file, it prints the number of times it saw each of your initials in either upper or lower case. Group together the counts of upper and lower case letters for each initial. If you have only two distinct initials (as in mine are SH), you have only two counts being printed. Use your initials; they are not read from the command prompt.

6. Write a shell script which opens all files in the local directory containing the letter G in their filenames and prints out a total number of characters for each file and a grand total at the end for all files seen.

7. Extra Credit:

a. What does the following print?

```
char s[]="STRING", *p=s+3;
```

```
cout << p;
```

```
cout << p[-1];
```

```
cout << --*++p;
```

b. describe grep and give an example where it would be useful