Operating Systems – Diagnostic test on C and Unix
Time Limit – 20 minutes

Full Name:

Instructions: Write only one-line answers.

Q-1: [5 points] Assume that your current directory in Unix environment contains the following files

part1.c, part1.o, part2, poem1, poem2, quiz6

(a) What is the output of the following command? ***ls po****

poem1, poem2

(b) What does the following command do? ***cp part1.c part1.tmp***

Copies the file part1.c to part1.tmp

(c) What does the following command do? ***grep BU part1.c | more***

Searches for the lines containing string BU in the file part1.c and displays the lines one at a time.

(d) What does the following command do? ***mkdir mydir ; cd mydir***

Makes a directory mydir and changes the current directory to mydir.

(e) Assume your current directory is ***mydir***. What does the following command do?
mv ../poem* .

moves all files in the parent directory whose names begin with the prefix poem to the mydir directory.

Q-2: [4 points] Given a set of N objects, what data structure can be used to search an object in ***constant time in the average case***? What is the ***worst-case search complexity*** for this data structure?

Hash table.
Worst case complexity is O(N).

Q-3: [4 points] What is the return value of function **`g()`** in this program fragment?

```
int  f( int  x )
{
     x++;
     return x;
}

int g(void)
{
     int x = 2;

     f(x);

     return (x);
}
```

Answer: 2

Q-4: [4 points] Let **`i, j,`** and **`k`** be integer variables, each having a value of **`3`**. What are the values of i, j, and k after the execution of the following statement?

```
i  *=  ++j  +  k-- ;
```

Answer:

i = (4+3)*3 = 21
j = 4
k = 2

Q-5: [3 points] Write a macro (i.e, use **`#define`**) called '**`mymacro`**' that takes two parameters, x and y. If **`x < y`**, it should give you the value of **`x*y.`** Otherwise it should give you the value of **`x/y`**. You must use a conditional expression in the macro definition to accomplish this.

Answer: #define mymacro(x,y) (((x) < (y)) ? (x)*(y) : (x)/(y))

Q-6: [3 points] Consider the following code fragment:

```
char arr[10] = {'a','b','c','d','e','f','g','h','i','j'};
char *p = &arr[4];
```

What is the value of **`p[3]`**?
Answer: arr[4] = 'e'. So p[3] = 'h'