

Northern Michigan University (Marquette Co, MI)

CS201-01-22F: Introduction to C++ (Andrew A Poe)
Practice Midterm Examination (Exam 1) Page 1/2

Name: _____
Monday 10 October 2022 11:00 A.M. EDT

Time: 50 minutes

For the following programs, write the code as directed. Do not worry about `#include` files or minor syntactic errors such as semicolons or matching braces. However, your code should be as correct as possible. Make sure all special cases are handled correctly. Make sure you call and use all methods correctly. If you write more than one method to solve a problem, make sure you declare your headers correctly, but you don't have to worry about prototypes.

1. Write the code for the method

```
bool MatchedParentheses (string s);
```

`s` contains only ('s and ')s. It returns true if the `s` contains a valid set of matched parentheses. `((()))` or `()()` are valid. `)(` or `()` or `())()` are not valid. A good way to do it would keep a counter, starting at 0. If you see `(` add one, if you see `)`, subtract one. The parentheses are matched if the counter ends at 0 and never went negative at any point in the process.

```
bool MatchedParentheses (string s) {  
  
    int ct = 0;  
    for (int i=0; i < s.length(); i++) {  
        if (s[i]=='(') ct++;  
        if (s[i]==')') ct--;  
        if (ct < 0) return false;  
    }  
    if (ct==0) return true;  
    return false;  
}
```

2. Write the code for the method

```
int **AdditionTable (int r, int c);
```

This makes a two-dimensional array with `r` rows and `c` columns, loads it up with an addition table, and then returns it. For example, `AdditionTable (5,5)` returns

```
0 1 2 3 4  
1 2 3 4 5  
2 3 4 5 6  
3 4 5 6 7  
4 5 6 7 8
```

```
int **AdditionTable (int r, int c) {  
  
    int **T = new int*[r];  
    for (int i=0; i < r; i++) {  
        T[i] = new int[c];  
        for (int j=0; j < c; j++)
```

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```
    T[i][j] = i+j;
}
return T;
}
```

3. Write code for the method

```
bool AddToSeven ();
```

This method rolls five normal six-sided dice. It returns true if there is ANY subset of those five dice that add to 7. E.g. 2 2 3 2 2 returns true, since $2+2+3=7$. 1 1 1 1 2 returns false.

```
bool AddToSeven () {

    int d0=rand()%6+1, d1=rand()%6+1, d2=rand()%6+1, d3=rand()%6+1,
        d4=rand()%6+1;

    for (int a0=0; a0 < 2; a0++)
        for (int a1=0; a1 < 2; a1++)
            for (int a2=0; a2 < 2; a2++)
                for (int a3=0; a3 < 2; a3++)
                    for (int a4=0; a4 < 2; a4++) {
                        if (a0*d0+a1*d1+a2*d2+a3*d3+a4*d4==7) return true;
                    }
    return false;
}
```

4. Write code for the method

```
void PrintEveryOtherLine (string fname);
```

This prints every other line contained in the file whose name is given in fname. For example, if the file contained

Alpha
Bravo
Charlie

The program would print

Alpha
Charlie

```
void PrintEveryOtherLine (string fname) {

    ifstream in (fname);
    bool printit = true;
    string line;
    while (getline(in,line)) {
        if (printit) cout << line << endl;
    }
}
```

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```
    printit = !printit;  
}  
}
```