MTH 4300: Algorithms, Computers, and Programming II

Spring 2025

Midterm Review

1 TRUE OR FALSE

1. The command to compile and rename a file is: g++ main.cpp -o main
2. the literal "apple" is an lvalue
3. the float data type can **only** store positive integers
4. while loops are used when you need a program to loop, and the number of times it will loop is detetmined at run time.
5. Is this syntax correct: int matrix[3][3] = {1, 2, 3},{4, 5, 6},{7, 8, 9};
6. Base case for recursion is always required
7. Arrays are technically pointers
8. new is used to mark an item as never seen before
9. Passing by reference allows you to avoid copying an object, improving performance, but returning by value ensures the caller receives a new copy of the object.
10. All variables on the heap must be referenced using pointers

2 SHORT ANSWER

1. What is the downside of storing variables in the function call stack?
2. What is the terminal command to create a new folder?
3. Fix the function below:

```
void my_function(int param1, param2)
{
  cout<"hello"<<endl;
  return 7;
}
```

4. initialization list must be used if one of your attributes is a reference variable.
5. What does the sizeof function return ?
6. Whats a disadvantage of recursion?
7. Consider the function signature **void func(int alpha, int beta=9, gamma)**, is the syntax correct ?
8. Whats a dangling pointer and how is it caused.
9. does int* const ptr; make the address stored or the content of the address stored const?
10. The variable int* pointer = &x; is stored on the heap or the stack?

3 CODING(midterm will only have 2 questions here)

1. Write a c++ class to describe a toaster. Make sure to include at least 3 attributes(set to private), 3 methods(set to public), and a constructor(set to public). Write a main function and create 2 objects in the main. Figure out a way to print one of your attributes in the main by calling one of your methods.
2. Write a main function that creates a 5 by 5, 2d integer array(on the heap or stack whatever you prefer). Then prompt the user to enter a row number x, and a value y. For row x, fill up each entry with (y + column number).
3. What does the following code print:

```
int x = 10;
int* y = &x;
x=17;
*y=22;
cout<<x<<endl;
```

4. What does the following code print:

```
#include<iostream>

using namespace std;

void func(int n);

int main()
{
    func(10);
    return 0;
}

void func(int n)
{
    if(n==0)
    {
        cout<<endl;
        return;
    }

    cout<<"#";
    func(n-1);
    cout<<"%";
}
```