Object Oriented Programming & Design - Monsoon 2023

Final Practice Questions

Student's Details

Name of the Student:

Roll Number:

Stream:

1 Short Conceptual Questions (3x15=45 points)

There are 20 questions in this section each worth 3 points. You may write the answers to these questions succinctly.

A1 What will the data type of type T2 be in the following program? Justify.

```
template<class T1, class T2>
void checkGreaterThan(T1 a, T2 b);

int main(void) {
    cout << checkGreaterThan(5, 6);
    cout << checkGreaterThan(5, 3.2);
    return 0;
}
```

A2 Is the following program designed correctly? If so, what is the output? If not so, explain why it is incorrect.

```
int main(void) {
    vector<int> list{1, 2, 4, 5, 6};
    for (int ctr = 0; ctr < list.size(); ctr++)
    {
        if (list[ctr] % 2 == 0)
            list.push_back(10);
    }
    cout << list;
    return 0;
}
```

Roll Number:

A3 Is it possible to get the following cast working?

```
class MyBase
{
  public:
  void test() {}
};
class MyChild : public MyBase {};
int main(void) {
    MyChild *child = new MyChild();
    MyBase  *base = dynamic_cast<MyBase*>(child);
    /*Use base to handle further */
    return 0;
}
```

A4 Consider a case of two distinct (unrelated) programs communicating via pipes. Does the stream of data go via the Virtual File System? If so, what will the inode point to?

A5 Consider the conda environment that is very frequently used to set up python and its related libraries. Suppose you activate it and its python. You now enter the python shell and run a command. Where is this command interpreted, and how is the system ensuring that the right python version is being used?

A6 Consider a program that requires some dependency software that is difficult to install. Is there any way you can transfer it easily to another machine?

A7 Suppose you are checking at a number of places if a linked list has non-integer value, and if so, you are doing a different operation. Is it a good idea to use lambda functions to do this check?

A8 Which of the following functions is going to be faster and why?

```
    class Stack{
     /* standard stack operations */
     int push_with_exception(int val) {
        if (size > 100) {
            throw OverFlowException;
        }
        arr[size++] = val;
    }
    int push_without_exception(int val) {
        if (size > 100) {
            return -1;
        }
        arr[size++] = val;
        return 0;
    }
};
```

Roll Number:

A9 What will be the output, and which of the following accesses is going to be faster and why?

```
int main(void) {
    vector<int> x;
    cout << x.at(1);
}

int main(void) {
    vector<int> x;
    cout << x[1];
}
```

A10 Consider an STL iterator that requires you to get the elements in reverse order. Is this possible, and how would you access the next element?

A11 Consider an STL container that has been created. How would you deallocate its memory, and handle its memory leaks?

A12 Compare the speed of the following codes:

```
class abcd {
    public:
    int x;

    int add(val) {
        return x + val;
    }

    int operator+(val) {
        return x + val;
    }
};
int main(void) {
    abcd a;
    a.x = 5;
    cout << a.add(10);
    cout << a + 10;
    return 0;
}
```