Warm Up Exercises Week 8

1. Below is a class for a Student

```
/*C++ program to create class for a student.*/
#include <iostream>
#include <string>

using namespace std;

class student
{
     private:
          string    name;
          int       rollNo;
          int       total_marks;
          int       year;
     public:
          //member function to get student's details
          void getDetails(void);
          //member function to print student's details
          void putDetails(void);
};
```

i. Write the function getDetails() which prints to the screen the values of the name, rollNo, total_marks (on exams scored) and year (an integer representing the year of study of the student).

ii. Write constructors for the class (overload them as you think appropriate)

iii. Write a mutator function that allows the user to change the name of the student.

iv. Write a mutator function that allows the user to change the year of the student but does NOT allow the year to be more that 4. If the year attempted to be assigned is more than 4, the program should advise that the student has to leave the university.

v. Within main create an array of Student objects (no more than 10) and print their details to the screen.

2.

i. Amend the student class above (of question 1) so that there are now fields mathMark, computingMark and physicsMark

ii. Write a function called averageMark which computes the average of the three marks (for mathematics, computing and physics respectively). You can calculate a weighted average if you want to.

iii. Write a function called void gradeMark(int mathIn, int compIn, int physicsIn) which states the degree classification of the student, eg if the average mark is

greater than 70 the output to the screen is “first class”, if the average is more than 60 but less than 69 the output to the screen is “2:1” etc.

iv. Overload the gradeMark function so that when the student only takes only two courses so that void gradeMark(int mark1, int mark2), the average is the arithmetic mean of these two marks (and not of the three as before). The appropriate message to the screen will again be seen for the degree classification.

3. Below is a class called point

```
#include <iostream>
using namespace std;

// class declaration
class Point
{
	private:
		int X, Y;

	public:
		//defualt constructor
		Point () {X=0; Y=0;}

		//setter function
		void setPoint(int a, int b)
		{
			X = a;
			Y = b;
		}
		//getter functions
		int getX(void)
		{
			return X;
		}
		int getY(void)
		{
			return Y;
		}

};
```

i. Write overloaded constructors for the above class Point(), Point(int), Point(int,int), the no argument constructor sets the point to the origin, Point(int) sets the x value to 0 and the y value is passed as an argument and Point(int, int) allows the user to set the values of x and y.

ii. Write a function that calculates the geometric mean of the two numbers (multiply the two numbers together and then take the square root).

iii. Overload the constructor so that the point can have 3 components (x,y,z)

iv. Write a function that calculates the geometric mean of these three numbers (you will need to use pow(x*y*z, 1/3).