Name:……	ID: ……	Section: ….

Sultan Qaboos University

College of Science

Department of Computer Science

COMP2101: Introduction to Computer Science - Spring 2009

Midterm Exam

Sunday, March 22nd 2009

Duration: 75 minutes

Note the following:

- Exam consists of two different parts (pages + first page)
- PART I consists of questions that address the theory part of the course.
- PART II consists of questions that address the programming part of the course.
- Write down your name, ID and section number in each page of the exam sheets.
- Calculators are not allowed

Grading Table

Part	Total Mark	Your Mark
PART I	20	
PART II	20	
Grand total	**40**	

Name:……	ID: ……	Section: …….

PART II (Programming):

Question	Full Mark	Your Mark
Q1	6	
Q2	10	
Q3	4	
TOTAL	**20**	

Q1: (6 points) Expressions and rules of precedence

1. Translate the following mathematical formula into a C++ expression
   Make necessary declarations **(3 points)**

Formula	**C++ expression (x, y, z, α and β are real numbers)**

$z = \sqrt{\frac{x\cos(\alpha) - y\sin(\beta)}{\lvert x^y + y^x \rvert}}$	// Declarations (1point)
	float x,y,z,alpha, beta;
	//Statement (2 points)
	Z=sqrt((x*cos(alpha)-y*sin(beta))/abs(pow(x,y)+pow(y,x))

2. Assume the following declarations **(3 points)**

```
int a=12, b=4, c=10;
float x=5.0, y;
```

a. Evaluate the C++ expressions below (1 point)

Expression	**Value**
Y = X - C / B + 3.5	**6.5**

b. Indicate the order in which the operations in the following C++ expressions are executed (2 points)

Y = sqrt (A % (B - 1) / (B + 1))

3 1 4 2

Name:……	ID: ……	Section: …….

Q2: (10 points) finding and correcting errors:

1. Circle at least five (5) errors in the following C++ program. **(5 points)**
   Errors that occur in the same line are counted as one error.
   Please note that Sterling formula is defined as follows: $n! = e^{-n} n^n \sqrt{2\pi n}$
   And there is a C++ function in cmath library exp (n)=e^n

1.	`#include <iostream>`
2.	`#include <cmath>`
3.	
4.	`using namespace std`
5.	`/ This function calculates factorial of n using Sterling formula`
6.	`int main{`
7.	`double Sterling, PI=3.14159;`
8.	`int n;`
9.	
10.	`cout << "Please, enter n: " ;`
11.	`cin << n;`
12.	`Sterling= exp(n)* -n pow(n)*sqrt(2*PI*n);`
13.	`cout<< "value of n! is:"<<setw(10)<<Sterling << endl;`
14.	`return 0;`
15.	`}`

2. For each of the errors you circled above, rewrite the **whole corrected** statement in the table provided below according to the line number where it should be included **(5 points)**

Error #	line #	Write **the whole correct** Statement
1.	4	`Using namespace std;`
2.	5	`// This function calculates factorial of n using Sterling formula`
3.	6	`int main()`
4.	11	`cin>>n;`
5.	12	`sterling= exp(n)* pow(double(n),-n)*sqrt(2*PI*n);`
6.	3	`#include <iomanip>`

Name:……	ID: ……	Section: …….

Q3: (4 points) Write in the table provided below, the exact output of the following program. *Note: Each cell of the table represents one character location.*

```
#include  <iomanip>
#include  <iostream>
#include <string>
using  namespace  std;
int  main()
{
  string item1="hard disk", item2="mouse";
  int num1= 10, num2=20;
  float totalPrice1=157,totalPrice2=15.557;
  cout<<fixed<<showpoint<<setprecision(1);
  cout<<num1<<"units of"<<item1<<"were sold\n";
  cout<<setw(12)<<"Total price="<<setw(6)<<totalPrice1<<endl;
  cout<<setprecision(2);
  cout<<setw(4)<<num2<<setw(9)<<"units of"<<setw(6)<<item2<<" were sold\n";
  cout<<setw(12)<<"Total price="<<setw(8)<<totalPrice2<<endl;
  cout<<endl;
  return 0;
}
```

1	0	u	n	i	t	s		o	f	h	a	r	d		d	i	s	k	w	e	r	e		s	o	l	d					
T	o	t	a	l		p	r	i	c	e	=		1	5	7	.	0															
		2	0		u	n	i	t	s		o	f		m	o	u	s	e		w	e	r	e		s	o	l	d					
T	o	t	a	l		p	r	i	c	e	=				1	5	.	5	6													