**Set A**

**This Set Contains TWO Questions. Students must attempt ALL TWO questions.**

**Each question carries 2.5 marks.**

**Q1] Write a class Spherewith variable radius which includes functions that calculate and return the volume and surface’s area. Implement accessor to show the length of radius the user has input and mutatorto set the value the user has input in your program.**

**Your program should ask the user to input the side of radius and validate the side the user has input(implement loop).**

**Sample output:**

**Enter the radius of sphere : -10**

**Invalid input! Please input again.**

**Enter the radius of sphere : 2**

**Following are the details of the sphere:**

**The length of radius is : 2**

**Sphere Volume : 33.51**

**Sphere Area : 50.27**

**Formula:**

**Cube’s Surface Area = 4 x x radius x radius = 4 r2**

**Cube’s Volume = 4/3 x x radius x radius x radius = 4/3 r3**

***[1 marks for each functions written correctly***

***1 mark for correct class declaration/object creation and calling***

***0.5 marks for execution]***

// A program to Demonstrate a simple class

#include <iostream>

#include <iomanip>

using namespace std;

//class sphere declaration

class Sphere

{

private:

const double PI = 3.14159;

double radius;

public:

//mutator or setter

void setRadius(double r)

{

radius = r;

}

//accessor or getter

double getRadius() const

{

//side = 10;

return radius;

}

double getArea() const

{

return 4 \* PI \* radius \* radius ;

}

double getVolume() const

{

return 4.0/3 \* PI \* radius \* radius \* radius ;

}

};

int main()

{

Sphere sq1;

double radius;

cout<<"What is the radius of sphere?";

cin>>radius;

while(radius<=0)

{

cout<<"Invalid Input!! What is the length of side?";

cin>>radius;

}

//store the side of square in sq1 object

sq1.setRadius(radius);

//display the squares data.

cout<<fixed<<setprecision(2);

cout << "Here is the data of square : \n"

<< "Side: " << sq1.getRadius() << endl

<< "Area: " << sq1.getArea() << endl

<< "Volume: " << sq1.getVolume() << endl;

return 0;

}

**Q2] Write a program to find the greatest of three numbers of an array and find out whether that number is even or odd. Your program should validate the input sent in array. Use functions**

**1) to input the items in array and 2) find the largest element in array**

**Sample output:**

Enter three numbers:

10

20

30

30 is the largest

30 is even

***[1 mark for correct largest function***

***1 mark for correct even odd function***

***.5 mark for correct execution]***

//WAP to find the largest number of 3 numbers and evenodd

#include <iostream>

using namespace std;

void takeInput(int a[],int SIZE)

{

for(int i= 0; i < SIZE; i++)

{

cout<<"Enter the element #"<< i+1;

cin>> a[i];

}

}

bool getLargest(int a[],int SIZE)

{

int max = a[0];

for (int i = 1; i < SIZE; i++)

{

if (a[i] >= max)

max = a[i];

}

cout<<"Largest is"<<max;

if (max % 2 == 0)

cout<<max<<"is Even";

else

cout<<max<<"is Odd";

}

int main()

{

const int SIZE = 3;

int a[SIZE];

takeInput(a,SIZE);

getLargest(a,SIZE);

return 0;

**Set B**

**This Set Contains TWO Questions. Students must attempt ALL TWO questions.**

**Each question carries 2.5 marks.**

Q1] Write a class **Cuboid**with variable **length, breadth and height** which includes functions that calculate and return the volume and surface’s area. Implement **accessor** to show the length of side the user has input and **mutator**to set the value the user has input in your program.

Your program should **ask the user to input the sides of Cuboid** and **validate** the side the user has input(implement loop).

**Sample output:**

Enter the sides of Cuboid :

Length: -10

Breadth: -10

Height: -10

Invalid input! Please input again.

Enter the sides of Cuboid :

Length: 2

Breadth: 2

Height: 2

Following are the details of the cube:

Length: 2

Breadth: 2

Height: 2

Cuboid volume : 8

Cuboid Area : 24

Formula:

Cuboid Surface Area = 2(lb+bh+lh)

CuboidVolume = lbh

***[1 marks for each functions written correctly***

***1 mark for correct class declaration/object creation and calling***

***0.5 marks for execution]***

// A program to Demonstrate a simple class

#include <iostream>

#include <iomanip>

using namespace std;

//class cuboid declaration

class Cuboid

{

private:

double length,breadth,height;

public:

//mutator or setter

void setlength(double l,double b,double h)

{

length = l;

breadth = b;

height = h;

}

//accessor or getter

double getlength() const

{

return length;

}

double getArea() const

{

return 2\*(length\*breadth+breadth\* height+length\*height) ;

}

double getVolume() const

{

return length\*breadth\*height ;

}

};

int main()

{

Cuboid sq1;

double l,b,h;

cout<<"What is the length breadth and height of cuboid?";

cin>>l>>b>>h;

while(l <= 0 || b <= 0 || h <= 0 )

{

cout<<"What is the length breadth and height of cuboid?";

cin>>l>>b>>h;

}

//store the side of square in sq1 object

sq1.setlength(l,b,h);

//display the squares data.

cout<<fixed<<setprecision(2);

cout << "Here is the data of square : \n"

<< "Side: " << sq1.getlength() << endl

<< "Area: " << sq1.getArea() << endl

<< "Volume: " << sq1.getVolume() << endl;

return 0;

**Q2] Write a program by including pointer implementation of array and use following functions**

1. **which asks user to input sales figures for 3 days**
2. **which calculates and shows the total sales and average for 3 days.**

**Also implement Dynamic memory allocation and deallocation using pointers**

***[1 marks for DMA /input sales function***

***1 mark for correct calculation***

***0.5 marks for correct execution]***

// A program to

#include <iostream>

#include <iomanip>

using namespace std;

void getSales(double \*arr,int SIZE)

{

cout<< "Enter the sales figures below for \n";

for(int count = 0; count < SIZE; count++)

{

cout << "Day"<<count+1<<":";

cin >> \*(arr+count);

//cin >> arr[count];

}

}

double calculate(double \*arr, int SIZE)

{

double sum = 0;

for(int count = 0; count < SIZE; count++)

{

sum += \*arr;

arr++;

//sum += \*arr++;

// sum += arr[count];

}

return sum;

}

int main()

{

const int numDays = 3;

double \*sales;

sales = new double[numDays];

getSales(sales,numDays);

cout<<fixed<<showpoint<<setprecision(2);

cout << "The sum of total sales is : " << calculate(sales,numDays) << endl

<< "The average sales for " << numDays <<" days is :" << calculate(sales,numDays)/numDays << endl;

delete [] sales;

sales = 0;

return 0;

}

**Set A**

**This Set Contains TWO Questions. Students must attempt ALL TWO questions.**

**Each question carries 2.5 marks.**

Q1] Write a class **Cube** with variable **side** which includes functions that calculate and return the volume and surface’s area. Implement **accessor**  to show the length of side the user has input and **mutator**to set the value the user has input in your program.

Your program should **ask the user to input the side of cube** and **validate** the side the user has input(implement loop).

**Sample output:**

Enter the side of cube : -10

Invalid input! Please input again.

Enter the side of cube : 2

Following are the details of the cube:

The length of side is : 2

Cube volume : 8

Cube Area : 24

Formula:

Cube’s Surface Area = 6 x side x side = 6a2

Cube’s Volume = side x side x side = a3

***[1 marks for each functions written correctly***

***1 mark for correct class declaration/object creation and calling***

***0.5 marks for execution]***

// A program to Demonstrate a simple class

#include <iostream>

using namespace std;

//class Cube declaration

class Cube

{

private:

int side;

public:

//mutator or setter

void setSide(int s)

{

side = s;

}

//accessor or getter

int getSide() const

{

//side = 10;

return side;

}

int getArea() const

{

return 6\*side\*side;

}

double getVolume() const

{

return side\*side\*side ;

}

};

int main()

{

Cube sq1;

int side;

cout<<"What is the length of side?";

cin>>side;

while(side<=0)

{

cout<<"Invalid Input!! What is the length of side?";

cin>>side;

}

//store the side of Cube in sq1 object

sq1.setSide(side);

//display the Cubes data.

cout << "Here is the data of Cube : \n"

<< "Side: " << sq1.getSide() << endl

<< "Area: " << sq1.getArea() << endl

<< "Volume: " << sq1.getVolume() << endl;;

return 0;

}

**Q2] Write a program to swap two numbers using pass by value AND pass by reference using pointers.**

**Your program should include two functions calls, one for pass by reference and another for pass by value.**

**/\*C++ program to demonstrate methods of passing arguments in function.**

**Pass by value, Pass by reference, Pass by address.**

**\*/**

***[1/1 marks for each methods of swapping***

***0.5 marks for correct execution]***

#include <iostream>

using namespace std;

void swapByValue( int a , int b );

void swapByRef ( int &a, int &b );

void swapByAdr ( int \*a, int \*b );

int main()

{

int x = 10;

int y = 20;

cout << endl;

cout << "Value before Swapping x:" << x << " y:" << y << endl;

swapByValue( x , y );

cout << "Value before Swapping x:" << x << " y:" << y << endl;

swapByRef( x , y ); /\*Swapping reflect but reference does not take space in memory\*/

cout << "Value After Swapping x:" << x << " y:" << y << endl << endl;

x = 50;

y = 100;

cout << "Value before Swapping x:" << x << " y:" << y << endl;

swapByAdr( &x , &y ); /\*Swapping reflect but pointer takes space in memory\*/

cout << "Value After Swapping x:" << x << " y:" << y << endl << endl;

return 0;

}

void swapByValue( int a , int b )

{

int c;

c = a;

a = b;

b = c;

cout << "Value After Swapping x:" << a << " y:" << b << endl << endl;

}

void swapByRef( int &a , int &b )

{

int c;

c = a;

a = b;

b = c;

}

void swapByAdr( int \*a , int \*b )

{

int c;

c = \*a;

\*a = \*b;

\*b = c;

}

**Set B**

**This Set Contains TWO Questions. Students must attempt ALL TWO questions.**

**Each question carries 2.5 marks.**

Q1] Write a class **Cylinder**with variable **radius, height** which includes functions that calculate and return the volume and surface’s area. Implement **accessor** to show the length of radius the user has input and **mutator**to set the value the user has input in your program.

Your program should **ask the user to input the side of radius, height** and **validate** the side the user has input(implement loop).

**Sample output:**

Enter the radius of cylinder : -10

Enter the height of cylinder : -10

Invalid input! Please input again.

Enter the radius of cylinder : 2

Enter the height of cylinder : 2

Following are the details of the sphere:

The length of radius is : 2

Height of the cylinder is : 2

Sphere Volume : 25.3

Sphere Area : 50.27

Formula:

Cube’s Surface Area = 2 x x radius(height +radius) = 2 r ( h + r)

Cube’s Volume = x radius x radius x height = r2 h

***[1 marks for each functions written correctly***

***1 mark for correct class declaration/object creation and calling***

***0.5 marks for execution]***

// A program to Demonstrate a simple class

#include <iostream>

#include <iomanip>

using namespace std;

//class Cylinder declaration

class Cylinder

{

private:

const double PI = 3.14159;

double radius,height;

public:

//mutator or setter

void setlength(double r,double h)

{

radius = r;

height = h;

}

//accessor or getter

double getlength() const

{

return radius;

}

double getArea() const

{

return 2\*PI\*radius\*(height +radius) ;

}

double getVolume() const

{

return PI\*radius\*radius\*height ;

}

};

int main()

{

Cylinder sq1;

double r,h;

cout<<"What is the radius and height of Cylinder?";

cin>>r>>h;

while(r <= 0 || h <= 0 )

{

cout<<"What is the length breadth and height of Cylinder?";

cin>>r>>h;

}

//store the side of Cylinder in sq1 object

sq1.setlength(r,h);

//display the Cylinders data.

cout << fixed << setprecision(2);

cout << "Here is the data of Cylinder : \n"

<< "Side: " << sq1.getlength() << endl

<< "Area: " << sq1.getArea() << endl

<< "Volume: " << sq1.getVolume() << endl;

return 0;}

**Q2] Write a program to find the smallest of three numbers of an array and find out whether that number is prime or not. Your program should validate the input sent in array. Use functions 1) to input the items in array and 2) find the smallest element in array**

**Sample output:**

Enter three numbers:

7

20

30

7 is the smallest

7 is prime

***[1 mark for correct smallest function***

***1 mark for correct prime/not prime function***

***.5 mark for correct execution]***

//WAP to find the largest number of 3 numbers and evenodd

#include <iostream>

using namespace std;

void takeInput(int a[],int SIZE)

{

for(int i= 0; i < SIZE; i++)

{

cout<<"Enter the element #"<< i+1;

cin>> a[i];

}

}

bool getSmallest(int a[],int SIZE)

{

int min = a[0];

for (int i = 1; i < SIZE; i++)

{

if (a[i] <= min)

min = a[i];

}

cout<<"Largest is"<<min;

int count = 0;

for(int i = 1; i<=min; i++)

{

if (min % i == 0)

count += 1;

}

if (count == 2)

cout<<min<<"is prime";

else

cout<<min<<"is NOT Prime";

}

int main()

{

const int SIZE = 3;

int a[SIZE];

takeInput(a,SIZE);

getSmallest(a,SIZE);

return 0;

}