

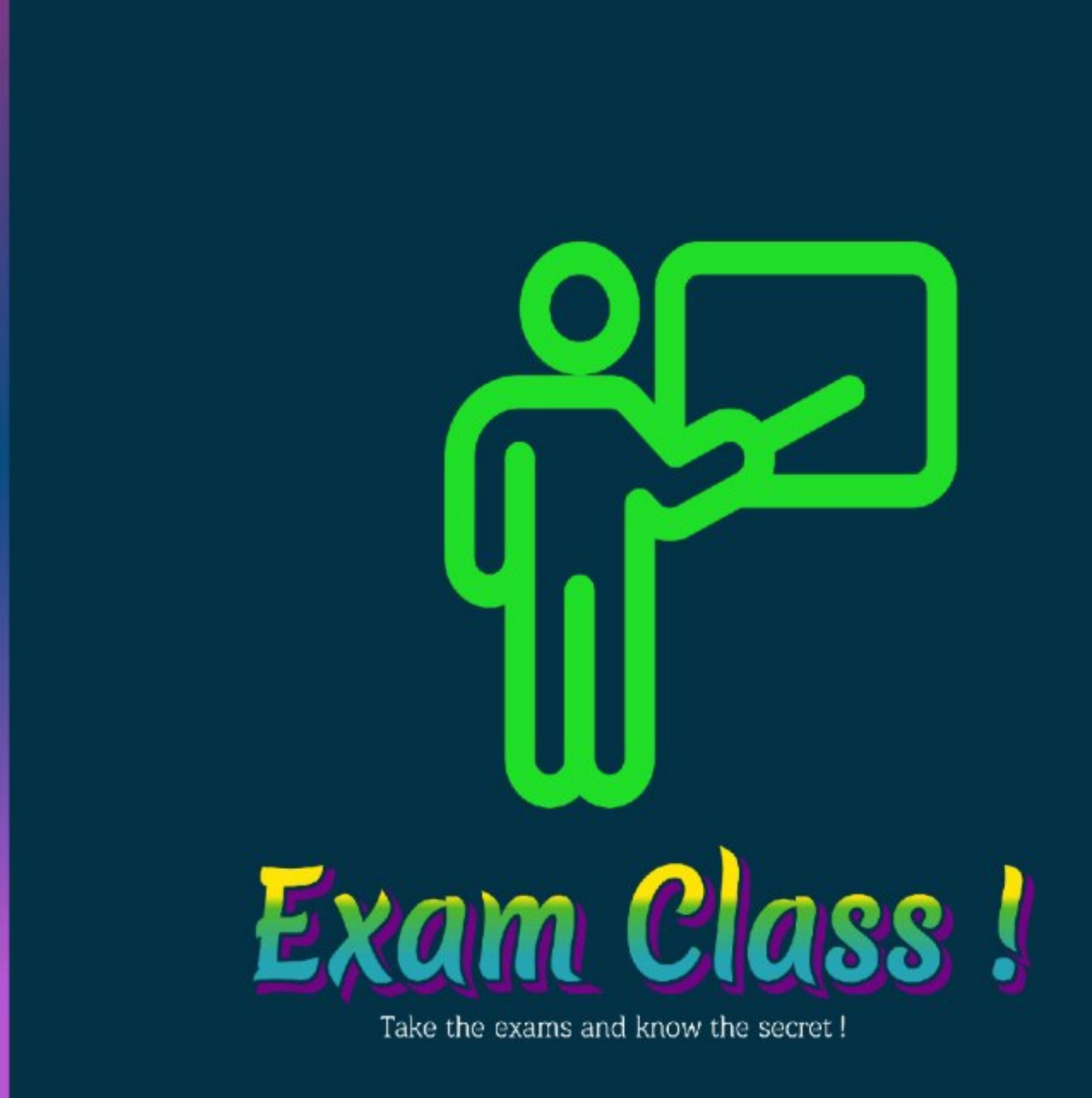

በ Exam Class ከ ቀለሜ ቻናል ጋር በመተባበር የተዘጋጀ !

III. Determine the output of the following c++ programs

7. 8 Points

```
int function(int a, int* b, int& c)
{
    a++;
    (*b)++;
    c++;
    return a;
}
int main()
{
    int a = 10;
    int b = 10;
    int c = 10;
    int d = 10;
function(a, &b, c);
  cout << a << " " << b << " " << c << " " << d << endl;
function(c, &d, a);
  cout << a << " " << b << " " << c << " " << d << endl;
c = function(b, &a, d);
  cout << a << " " << b << " " << c << " " << d << endl;
a = function(a, &a, a);
  cout << a << " " << b << " " << c << " " << d << endl;
return 0;
}
```

8. 5 Points

```
int main()
{
    for(int i=0;i<7;i++)
    {
        for(int j=0;j<i;j++)
        {
            if((j%2)==0){
                cout<<"- "<<j<<"-";
                continue;
            }
            else
                cout<<(i+j);
        }
        cout<<endl;
    }
}
```

IV. Write a c++ code for question 8-10. The code shall be neat well formatted and shall include all the appropriate headers and namespaces.

9. 5 Points

Write a C++ program that takes two numbers from the user and computes their sum, difference, product or division of the two numbers after asking the user what kind of computation they require to do.

10. 5 Points

In mathematics, greatest common divisor (**gcd**) of two numbers is the largest positive integer that divides each of the integers. One way to implement it is the **gcd** of x and y, where x>y is the same as the greatest common divisor of x and (x remainder y) until the remainder becomes zero. The last remainder before zero (the last y) becomes the gcd. For example, gcd of 688 and 12 is gcd of 12 and 4 because 4 is the remainder of 688 and 12. Finally **gcd** of 12 and 4 is 4 because the remainder is now 0. Write a c++ Program that implements the **gcd** function recursively.

11. 5 Points

Write a C++ program that accepts array of character of size 50 from the user, iterate through the array until the **null character** is found and print out the reverse of the given string.

Good Luck

Addis Ababa University
Addis Ababa Institute of Technology
Introduction to Computer Programming
Final Exam
Time Allowed: 3:00 hours

Note:

- Except the questions which require writing code, **assume that all the required header files and namespaces are included**
- For question which require identifying and programming bugs, it is not expected to write the entire code, rather writing the number in which the error located, what type of error it is and the debugging option (correction) of that error is enough. **Presenting your answer in a tabular form is highly encouraged.**

I. ***Explain the following in detail:***

1. Explain in detail about the major components of a computer system. **(3 points)**
2. List and briefly explain the different types of data types. **(3 points)**
3. What is the difference between a break and continue statement? **(3 points)**
4. Explain in detail about the concept of: **(3 points)**
   a. Recursion
   b. function overloading

II. ***The following programs has one or more syntax, runtime or logical errors or even the combination of all the errors. So, identify all errors in the program, and propose your debugging mechanism:***

5. **(3 Points)**

```
1. int main ()  //program to calculate the body mass index of a person
2. {   float height, weight, bmi;
3.         bmi=weight/(height*height);
4.     cout<< "enter your height\n";
5.     cin>>height;
6.         cout<< "enter your weight;
7.         cin>weight;
8.         cout<< "your body mass index is" <<bmi;
9. return 0;
10. }
```

6. **(3 Points)**

```
1.  int main()
2.  {
3.     /*  program intended to convert
4.        the Celsius scale to the
5.        corresponding Fahrenheit scale */
6.     double tF = 0;
7.     double tC == 0;
8.     const double conversionFactor;
9.     cout<<"Enter the conversion Factor : ";
10.    cin>>conversionFactor;
11.    cout<<"Enter the TC value: ";
12.    cin>>tC;
13.    conversionFactor *tC+32=tF;
14.    cout<<" The farhanite equivalent of "
15.        <<tC<<" is "<<tF<<endl;
16.    return 0;
17. }
18.
```

7. **(4 Points)**

```
1.  int main ()
2.  {
3.      char name [10];
4.      String father_name;
5.      char full_name [10];
6.      name= "Abebe";
7.      father_name = "Kebede"
8.      full_name = name + father_name;
9.      cout << "Your full name is" << full_name;
10.     return 0;
11. }
```

Part I: Say true if the statement is correct or false if it is wrong (5 pts.)

1. Every C++ program must have a main () function.
2. Internal components of a computer are classified as software components.
3. Utility Programs is a program that perform specific tasks related to managing computer resources or files.
4. A given problem can have more than one solution and all solutions may not be efficient.
5. Analog computers are general purpose computers.

Part II: Choose the best answer from the given alternatives (10 pts.)

1. Which one of the following is **a valid comment**?
   A. /** comment /* B. /*comment*/ C. /*comment /* D. \\comment
2. Which of the following is not correct variable declaration?
   A. int abc; B. double _xy; C. float 3xy; D. char ch;
3. Which of the following is not major characteristic that distinguish generations of computer?
   A. Dominant type of electronics circuit elements they used
   B. Major secondary storage they used
   C. Computer they used language
   D. None
4. Which of the following is different?
   A. Cache B. Hard Disk C. Main Memory D. Registers
5. The characteristics of computer which enable to do more than one tasks at a time is
   A. Accuracy B. Versatility C. Reliability D. Diligence
6. With the help of _____, we can make copies of files to be used in case of the original data is lost/damaged.
   A. file compression B. backup software C. anti-virus software D. file viewer
7. Suppose that int y=8, X=3; what is the result of int Z= - -y + X++;
   A. 10 B. 11 C. 14 D. 12
8. All of the following devices are input devices except?
   A. Printer B. Scanner C. Keyboard D. Mouse

9. Which of the following data types is used to initialize decimal numbers?

A. char B. string C. float D. int

10. What will be the value of **X** according to the following condition?

Suppose the value of a =20 and b=50

X = (a>b && 10%3 == 1)? a+5 : b-5;

A. 50 B. 45 C. 20 D .25

Part III: Write the appropriate answers the following questions (15%).

1. List and explain 5 stages of software/program development. [2.5pt]
2. List at least four major functions operating system. [2pt]
3. Define application software and system software with suitable example. [2pt]
4. Write algorithm and draw a flowchart that display the sum of the first 5 natural numbers. [3pt]
5. Write algorithm and draw a flowchart to login to your Facebook account. (Hint: You have to check your UserName and PassWord) [3pt]
6. Write a complete C++ program to compute the sum of two numbers.[2.5pt]

Part II: Write the output of the following Code Fragments? (10 Pt

No	C++ code fragment	output
1	int x=5, y=4, z=3; cout<< "Sum = "<<(x++, ++z, ++y + x +z);	

2	int n=10, m=4,r;
	cout<<"pro="<<n*m++<<endl;
	r= m!=0? n%m : n/m;
	cout<<"Result = "<<r;	

3	int x=5, y=5,z=2;
	z+= x%y + x++ + --y - 2;
	cout<< "Sum = "<<z;	

4	int p = 5, q=2, r=14, x=1,t;
	t=x ==3 ||!(r>=p && r <q);
	cout<<"T is "<<t;	

5	int a = 4;
	switch(a - 2)
	{
	case 2:
	cout << a;
	default:
	cout << a;
	}	

Part III: Short Answer: Give your short answer on the attached p

1. Describe the relationship between an algorithm and program (2 pts)
2. Mention at least four points about the purpose of a data type (2 Pts)

Part IV: Write a C++ program for the following questions

1. You are expected to write **an algorithm (Pseduocode)** and a program that a numbers a, b and c from the keyboard and displays the largest one **USING C OPERATOR ONLY. (3 pts)**
2. A math school teacher wants you to **write a program** that accepts two fractio **the form a/b** where a and b are respectively the numerator and denominator a sum of the two fractions. The result must be displayed in a/b format. (3 pts)

The output should be like this:

Fraction1 = 2/5
Fraction2 = 3/7

Sum = 29/35

Part III: Short Answer: Give your short answer on the attached paper.

1. Describe the relationship between an algorithm and program **(2 pts)**
2. Mention at least four points about the purpose of a data type **(2 Pts)**

Part IV: Write a C++ program for the following questions

1. You are expected to write **an algorithm (Pseduocode)** and a program that accepts three numbers a, b and c from the keyboard and displays the largest one **USING CONDITIONAL OPERATOR ONLY. (3 pts)**
2. A math school teacher wants you to **write a program** that accepts two fractions entered **in the form a/b** where a and b are respectively the numerator and denominator and display the sum of the two fractions. The result must be displayed in a/b format. **(3 pts)**

The output should be like this:

Fraction1 = 2/5
Fraction2 = 3/7

Sum = 29/35

I: Multiple choice questions: Circle the letter of your best choice (1 pts Each)

1. Which one of the following shows the correct steps for c++ program development?
   A. Editing, compiling, preprocessing, linking, loading, and executing
   B. Editing, linking, preprocessing, compiling, loading, and executing
   C. Preprocessing, editing, linking, compiling, loading, and executing
   D. Editing, preprocessing, compiling, linking, loading, and executing
   E. Editing, compiling, linking, preprocessing, loading, and executing

2. One of the following is not a programming language translator
   A. Assembler B. Compiler C. Debugger D. Interpreter

3. In which phase of program development an algorithm is translated in to a target programming language?
   A. Design B. Coding C. Testing D. Problem Definition

4. Which of the following is **TRUE** about high level language?
   A. It is directly understandable by the CPU
   B. Consists of string of 0's and 1's.
   C. It is easy to learn, write and debug
   D. Program written in high level language is generally faster when compared to program written in low level language.

5. Which one of the following shows the correct steps of problem solving?
   A. Problem definition, design, testing, coding and documentation and maintenance
   B. Problem definition, design, coding, maintenance, testing and documentation
   C. Problem definition, coding, design, testing and documentation and maintenance
   D. Problem definition, design, coding, testing, documentation and maintenance

6. Which of the following is the part of the C++ program development environment that is responsible to combine the C++ library objects that may have been referred in your source code with your code and generates a single executable file?
   A. Compiler B. Editor C. Preprocessor D. Linker

7. Which of the following statement is true?
   A. Interpreters produce an object code while compilers not.
   B. Compiled languages are usually portable.
   C. Program written in interpreted languages is generally faster than those written in compiled language.
   D. Assembler is a compiler

8. Which of the following is a VALID identifier that can be used to name objects?
   A. void B. bits C. day-22 D. long E. 22First

9. Which C++ token represents action in your program?
   A. Operators B. Variables C. Constants D. Keywords E. A and D

10. Which of the following is not a valid c++ literal?
    A. 'a' B. 65ul C. 25ab D. 24.5f E. '\a'

Part I. Multiple Choices (2 pts each)

1. Array is a collection of Heterogenous Elements?

   A. True B. False

2. What is the output of the following C++ source code?

```
#include <iostream>
using namespace std;
int arg1;
int main()
{
   arg1=-1;
   {
      char arg1='A';
      cout<<arg1
        <<'\t'
        <<::arg1
        <<'\n';
   }
   return 0;
}
```

   A. A -1 B. -1 A C. A A D. -1 -1

3. The maximum index in an array exceeds its size by one.

   A. True B. False

4. What is the output of the following C++ source code?

```
#include <iostream>
#define SIZE 10
using namespace std;
int arr[SIZE];
int main()
{
   int index,val;
   for(index=0,val=10; index<SIZE; index++,val+=10)
      arr[index]=val;
   index=0;
   int whatAmI=arr[index];
   while(index++ < SIZE)
      if(arr[index]>whatAmI)
         whatAmI=arr[index];
   cout<<"I am ="<<whatAmI;
   return 0;
}
```

   A. 10 B. 20 C. 50 D. 100

5. What would the following C++ code print?

```
#include <iostream>
#include <iomanip>
#define SIZE 5
using namespace std;
int main()
{  int arr[SIZE]= {10,2,6,4,8};
   int index=0;
   do
   { cout<<arr[index++]<<setw(3);
   } while(index<SIZE);
   //process Array
   for(int i=0; i<SIZE; i++)
   {
      int min=i;
      for(int j=i+1; j<SIZE; j++)
         if(arr[j]<arr[min])
            min=j;
      if (min!=i)
      {
         int temp=arr[min];
         arr[min]=arr[i];
         arr[i]=temp;
      }
   }
   index=0;
   cout<<"|";
   do
   { cout<<arr[index++]<<setw(3);
   } while(index<SIZE);
```

   A. 10 2 6 4 8 | 10 8 6 4 2 B. 10 2 6 4 8 | 10 2 6 4 8 C. 10 2 6 4 8 | 2 4 6 8 10 D. 2 4 6 8 10 | 2 4 6 8 10

6. What is the output of the following C++ source code?

```
#include <iostream>
#include <cstring>
using namespace std;
int main()
{
   char st1[]= {'A','d','d','i','s',' ', 'A','b','a','b','a','\0'};
   char st2[11]= {'u','n','i','v','e','r','s','i','t','y','\0'};
   char sp[]= {' ','\0'};
   char st3[23];
   strcat(st3,st1);
   strcat(st3,sp);
   strcat(st3,st2);
   cout<<strlen(st3)
     <<'\t'
     <<st3
     <<'\t'
     <<strstr(st3,"ni")<<'\t';
   strcpy(st1,st2);
   cout<<st1;
   return 0;
}//end of main
```

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A. 22 Addis Ababa University niversity University
B. 22 Addis Ababa University niversity Universitya
C. 23 Addis Ababa University niversity University
D. 23 Addis Ababa University niversity Universitya

7. **Which one of the following is an invalid variable name in C++?**
   A. int i_Variable
   B. double d_Variable
   C. char c_?Variable
   D. int ptr_123

8. **What is the output of this program?**

```
#include <iostream>
using namespace std;
int main()
{  char arr[20];
 int i;
 for(i = 0; i < 5; i++)
   arr[i] = 65 + i;
   arr[i] = '\0';
   cout << arr;
   return(0); }
```

   A. ABCDEFGHIJ
   B. ABCDE
   C. JJJJJJJJ
   D. none of the mentioned

9. **All of these are C++ keywords except.**
   A. else B. switch C. constant D. return

10. **which one of the following statements declare an array by the name stud of size 5 of student structure?**
   A. struct student stud[5];
   B. student stud[5];
   C. struct student { statements;} stud[5];
   D. all but A.

11. **what will the following program print if a user typed in a value 13 for N?**

```
#include <iostream>
using namespace std;
int main()
{
   int N;
   cin >> N;
   cout << ((N %5==0 && N >= 0) ?N/5 : -1) << "\n";
   return 0;
}
```

   A. -1 B. 2 C. 2.6 D. 26

12. **What is the output of the following source code?**

```
#include <iostream>
using std::cout;
int main()
{
   int num1=0;
   int num2=1;
   int next=0;
   cout<<num1<<','<<num2;
   do
   {
      next=num1+num2;
      num1=num2;
      num2=next;
      cout<<','<<next;
   }
   while(next<21);
   return 0;
}
```

   A. 0,1,1,2,3,5,8,13,21
   B. 01123581321
   C. 0,1,1,2,3,5,8,13
   D. 0,1,1

13. **What is the output of the following C++ code?**

```
#include <iostream>
using std::cout;
int main()
{
   int num=1;
   int sum=0;
   for(; num<=10; num++)
   {
```

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```
if(num%2==0)
    continue;
else
    sum+=num;
```

A. 1 B. 2

14. **What is wrong with the following C++ code?**

```
#include <iostream>
using std::cout;
int main()
{
    while(1)
    }
    cout<<"The Sum="<<sum;
    return 0;
}
```

C. 25 D. 55

```
    {
        cout<<"Hello World"
    }
}
```

A. Syntax error B. Logical error C. Missing semicolon D. All of the above

15. **Which looping in C++ executes its body at least once regardless of a condition or sentinel value?**

A. while(<condition>{}
B. do{}while(<condition>);
C. for(<initialization>;<condition>;<increment/decrement>){}
D. foreach(<iteration>){}

Part II. Workout Questions /10%, 5 pts each/

1. **Write a C++ code that computes and prints out area as well as circumference of a circle given radius from a user. [Hint: you must use PI defined as global constant].**

2. **Write a C++ program that implements a structure called student with properties id:int; name-array of size 20 and gender:char. You should create an array of five students, take input for the properties of each student from the user, and print out the entered values for the properties of students.**

Part I Say True or False& choose (1point each).

1. [redacted]A switch statement aren'tallows a variable to be tested for equality against a list of values.
2. [redacted]The expression of switch statement may be of type integer or character type.
3. [redacted]Which one of the following correctly declare an array?

   a) int array[10];
   b) int array;
   c) array{10}
   d) array array[10];

4. [redacted]A pointer is

   a. The address of a variable.
   b. An indication of the variable to be accessed next.
   c. A variable for storing addresses.
   d. The data type of an address variable.

5. [redacted]What is the index of the last element of an array 9 elements?

a) 9
b) 8
c) 0
d)10

Part II Fill the blank with the correct answer (1 point each).

6. write the syntax of while loop & do while

   loop [redacted]

   [redacted]

   [redacted]

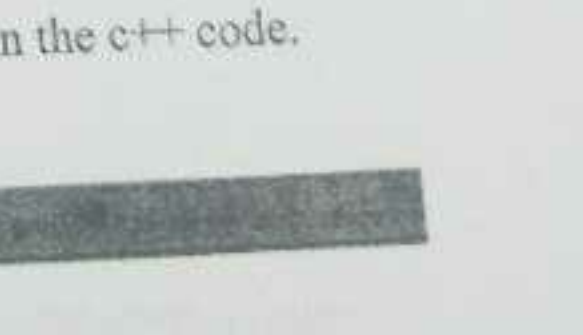
7. [redacted]Types of variables can be referred from anywhere in the c++ code.
8. [redacted]Arithmetic operation can be done in pointer.
9. An address is a [redacted], while a pointer is a [redacted]

10. Write expressions for the following: **(1 pt each)**

    a. The address of var [redacted]
    b. The contents of the variable pointed to by var [redacted]
    c. The variable var used as a reference argument [redacted]
    d. The data type pointer-to-char. [redacted]

11. Consider a 2-by-3 integer array **t**.**(1 pt each)**

    a) Write a declaration for **t**? [redacted]



b) How many rows does **t**have?

c) How many columns does **t**have?

d) How many elements does thave?

e) Write the names of all the elements in the second row of **t**?

f) Write the names of all the elements in the third column of **t**.

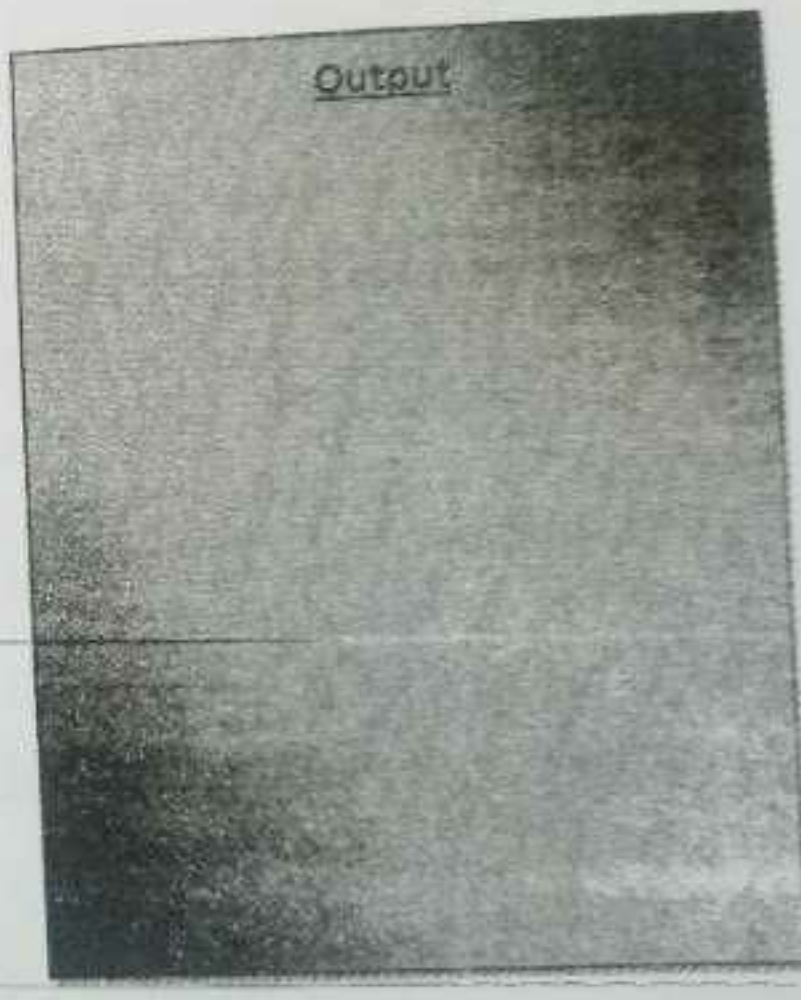
12. Identify and correct the error(s) in each of the following:**(4 pts)**

a)
```
if ( age >= 65 );
cout<<"Age is greater than or equal to 65"<<endl;
else
cout<<"Age is less than 65 <<endl";
```

b)
```
if ( age >= 65 )
cout<<"Age is greater than or equal to 65"<<endl;
else;
cout<<"Age is less than 65 <<endl";
```

c)
```
While ( x <= 100 )
total += x;
++x;
```

d)
```
while ( y > 0 ) {
cout<< y <<endl;
++y;
}
```



13. What is the output of the following program? **(5 pts)**

```
#include<iostream>
using namespace std;
int main() {
for(inti=1;i<=5;i++) {
for(int j=1;j<=5;j++)
{cout<<I;}
cout<<endl;}}
```



Part I: Write capital "T" if the statement is correct and capital "F" if incorrect

T 1. The length of a string does not include the terminating null character.

F 2. Any array of character can be converted into string type in C++.

F 3. It is possible to create two-dimensional array without specifying size.

F 4. Any of the three expressions in a for loop may not be empty.

F 5. Assignment statements are used to divert the execution path to another part of the program.

Part II: Choose the correct letter among the following alternatives (15pts).

D 1. Which of the following is/are true about an Array?

A. An array stores the same datatype elements.
B. Array stores different datatype elements.
C. The elements of an array are ordered by the index
D. Both A and C

D 2. Which of the following is not true about String?

A. The length of a string does include the terminating null character
B. String is a sequence of character
C. The null character indicates the end of the string
D. None

C 3.____is used for specifying alternate paths of execution, depending on the outcome of a logical condition?

A. Conditional statement B. Looping statement C. Branching Statement
D. None

D 4. If n is the length of an array, what is the value of last index?

A. n+1 B. n C. index 0 D

D 5. Which one of the following is true about branching statement?

A. It is an error to use the continue statement outside a loop.
B. It is an error to use the break statement outside a loop.
C. The return statement enables a function to return a value to its caller.
D. All of the Above

6. Which one of the following is not true about an array declaration?

A. int arrayName[];
B. string arrayName[];
C. char arrayName[10];
D. None

E 7. Which one of the following is correct about array initialization?

A. int array1 [] = {2,4,6,7,8,9};
B. int array2 [][] = {2,4,6,7,8,9};
C. int array3 [5] = {2,4,6,7,8,9};
D. int array4 [2][2] = {2,4,6,7,8,9};
E. all of the above

B 8. Which one of the following is not true about the array **int arrayName [] =** {1,3,5,7,9,11,17};

A. arrayName has 7 elements
B. size of arrayName is 7
C. it has syntax error
D. all of the above
E. none

D 9. Among the following control statement which one is odd?

A. break;
B. continue;
C. goto
D. while

B 10. Which one of the following is not correct initialization of **int arrayName [5];**

A. {11,12,13,14,15};
B. {11,12,13};
C. {11,12,13,14,15,16};
D. B and C
E. all of the above

B 11. Among the following branching statement which one is causes a jump out of these constructs, and hence terminates them?

A. continue; B. break; C. return; D. goto

D 12. From the statement given below, which one is provides that a way of choosing between a set of alternatives, based on the value of an expression.

A. if B. else C. do-while D. switch

D 13. What will be the output of the following code?

```
int k = 0;
while(k <= 10)
{
k++;
}
cout << k << endl;
```

A. Results in an infinite loop
B. 10
C. 11
D. Numbers 0 to 9 will be displayed.

D 14. Assume that the purpose of the program is to add all the odd numbers between 0 and 100. Therefore, what is the expected code to be written in the blanks space?

```
int n;
int sum = 0;
for (.....; .....; .....)
  {
        sum += n;
  }
```

A. n = 1; n + 2; n <= 100
B. n = 1; n <= 100; n + 2
C. n = 1; n <= 100; n += 2
D. n = 1; n <= 100; n++ 2

A 15. What will be the output of the following code?

```
int x = 5;
int y = 4;
x *= y + 2;
cout << x << endl;
```

A. 30 C. 5

2.

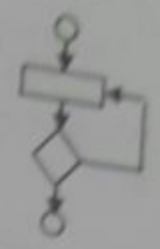
```
#include<iostream>
using namespace std;
1.  int main()
2.  {
3.      int i;
4.      int n =10;
5.      for(i=0;i<n-2;i++)
6.      {
7.          cout<<i;
8.      }
9.      cout<<endl;
10.     for(i=1;i<n;i++)
11.     {
12.         if(i!=(n-4))
13.         {
14.          cout<<i;
15.         }
16.     }
17. }
```

Part V: Write C++ programs for the following questions (10pts)

1. Write a C++ that checks either an integer number is even or odd. (2pts)
2. Write a program to display the day name as the user enters a number from 1 to 7. Hint use switch statement (1-Monday,2-Tuesday …) 2pts.
3. Write a C++ program that accepts your firstname, secondName, and idNumber, and then displays this information on screen (2pts)
4. Write a C++ program that computes multiplication of the first 10 positive integer numbers. Hint: use for or while loops. (2pts).
5. Write a program is to display 1 up to 10 horizontally (i.e. separated by tab '\t' as well as vertically use the endline '\n' or endl (2pts)

rt I: Multiple choice questions: Circle the letter of your best choice (1 pts Each)

1. Which control flow statement is represented by the flowchart shown in the figure?



   a. while loop
   b. do…while loop
   c. if statement
   d. if…else statement
   e. for loop

2. _____ is a function that invokes itself?
   a. Recursive function
   b. Inline function
   c. Built in function
   d. User defined function

3. A variable which is declared outside of any function can be called?
   a. File Scope
   b. Program Scope (Global) scope
   c. Local variable
   d. Limited scope

4. one of the following statement is correct about loop statements
   a. In the while loop the limit test is executed after the loop action
   b. In the do ....while loop the construct cannot be used for event-controlled loop
   c. In the do ....while loop necessarily the loop action will execute at least once.
   d. In the for loop necessarily the loop action will execute at least once.
   e. In all loop types the loop action may never execute at all.

5. How many times is the phrase "In the loop" printed when the following code is executed?

```
int i, j=20;
for(i=0; i<j; i++, j--)
{
    if(i%2==0) continue;
    cout << "In the loop" << endl;
}
```

   a. 20 b. 10 c. 0 d. 5 e. 2

6. One of the following is not the correct declaration of function.
   a. long FindArea(long length, long width);
   b. FindArea ();
   c. int FindArea ();
   d. void PrintMessage(int messageNumber);

7. For a given integer array `int a[size];` the statement `a[size-1]++;` will
   a. Increment the arrays size by one
   b. Add one element at the end of the array
   c. It does nothing because it is illegal statement
   d. Increment the last value by one
   e. It produces index out of array bound error

8. Given the declaration **double *p;** which of the following is **a valid** operation?
   a. p=5 - p; b. p=0x12A02FFF; c. p=p*5; d. p != 0;

Questions 9 and 10 are based on the following code fragment

```
int b[]={4, 8, 18, 10, 13}, *ip=b;
char c[]="try hard", d[]={'S', 'e', 'y', ' ', 'H', 'a', 'r', 'd'}, *cp=c;
```

9. Which of the following is **not a valid** way of modifying the third element of the array b to 8?

a. b[2]=8;
b. *(ip + 2)=8;
c. *(b + 2)=8;
d. ip[2]=8;
e. (*ip + 2)=8;

10. Which of the following is valid statement?

a. b++;
b. cp=c[2];
c. ip=cp;
d. ip=c;
e. cp=b;

Part II: Write the output of the following Code Fragments?

No	C++ code fragment	Output

1	`int main ()`
	`{`
	`  int n=8;`
	`  loop:`
	`  cout << n << ", ";`
	`  n--;`
	`  if (n>0) goto loop;`
	`  cout << "Good!\n";`
	`}`
		2 pts

2	`int n = 15;`
	`bool flg=true;`
	`do{`
	`  cout << n << " ";`
	`  if(n%4==0 && n%3 != 0)`
	`  flg=false;`
	`  else`
	`  n -= 2;`
	`}while(n>5 && flg);`
	`cout << n << " " << flg;`
		2 pts

3	`void func1(int& a, float &b, int c);`
	`int c=10;`
	`int main()`
	`{`
	`  int p=32, r=53;`
	`  float q=20;`
	`  cout<<p<<" "<<q<<" "<<r<<endl;`
	`  func1(p,q,r);`
	`  cout<<p<<" " <<q<<" "<<r<<endl;`
	`  return 0;`
	`}`
		3 pts

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	1 pts

II: Write a C++ program for the following questions

1. Write a c++ program that accepts an array of integer and display the smallest and the largest elements (3 pts) .
2. Write a c++ program that accepts a matrix element from the keyboard and transpose the matrix (3 pts).

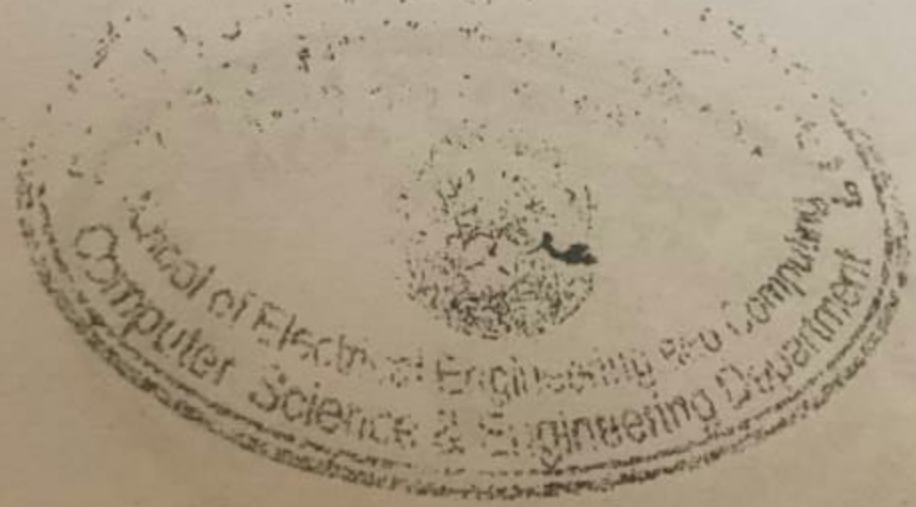
For example

1 2 3
4 5 6
7 8 9

into

1 4 7
2 5 8
3 6 9

transpose matrix



4

```
void func1(int& a, float &b, int c);
int c=10;
int main()
{
     int p=35, r=50;
     float q=10;
     cout<<p<<" "<<q<<" "<<r<<endl;
     func1(p,q,r);
     cout<<p<<" " <<q<<" "<<r<<endl;
     return 0;
}
void func1(int &a, float &b, int c=5)
{
     a=a+3*c;
     b=b+3*a;
     c=c+3*b;
     cout<<a<<" "<<b<<" "<<::c<<endl;
}
```

3 pts

5

```
int i, b;
int a[]={1,0,2,0,3,1,2,0,4,1,1,6};
 for (i = 1; i<= 12; i++) {
      b = 2*a[i-1];
      cout << b << " ";
      if(i % 4 == 0)
           cout<<endl;

 }
```

2 pts

6

```
char a[][20] = { "Kenya","Ethiopia",
"Uganda","Sudan"};
cout << a[3][1] << ' '  ,,<< a[2] <<
endl;
cout << *(a +1) << endl;
cout << *(*(a + 2) + 1) << endl;
```

3 pts

7

```
char *p, c[] = "Program";
p=c;
p+=5;
cout<<p;
```

1 pts

for the following questio

	`unc1(int& a, float &b, int c);`
	`=10;`
	`ain()`
	`int p=35, r=50;`
	`float q=10;`
	`cout<<p<<" "<<q<<" "<<r<<endl;`
	`func1(p,q,r);`
	`cout<<p<<" "<<q<<" "<<r<<endl;`
	`return 0;`
	`oid func1(int &a, float &b, int c=5)`
	`{ a=a+3*c;`
	`b=b+3*a;`
	`c=c+3*b;`
	`cout<<a<<" "<<b<<" "<<c<<endl;`
	`}`
		1 pts

	`int i, b;`
	`int a[]={1,0,2,0,3,1,2,0,4,1,1,6};`
	`for (i = 1; i<= 12; i++) {`
	`b = 2*a[i-1];`
	`cout << b << " ";`
	`if(i % 4 == 0)`
	`cout<<endl;`
		2 pts

	`char a[][20] = { "Kenya","Ethiopia",`
	`"Uganda","Sudan"};`
	`cout << a[3][1] << " " << a[2] <<`
	`endl;`
	`cout << *(a +1) << endl;`
	`cout << *(*(a + 2) + 1) << endl;`
		3 pts

6	`char *p, c[] = "Program";`
	`p=c;`
	`p+=5;`
	`cout<<p;`
		1 pts

Part III: Write a C++ program for the following

1. Write a c++ program that accepts an array o
gest elements (3 pts) .
c++ program that accepts a ma
pts).

Hawassa University
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Faculty of Electrical Engineering

Computer Programming Final Exam Time allotted 2:15 hrs

Name: _____ ***ID*** _____ ***Section*** _____

Part I: ***choose the correct answer from the given alternative and write it on the space provided [1.5pts each]***

___**1.** The position number contained within a square bracket *my_Array [6]* is referred as
A. Post-scripts B. Index C. Elements of an array D. [illegible]

___**2.**what is the output of the following fragmented code? {int i=10; if (i=20); cout << i;}
A. 10 B. 20 C. 0 D. Error

___**3.**When a=6 and c=a++ what is the value of c?
A. 6 B.7 C.8 D.9

___**4.**The statement *int A; b;* is invalid because ____
A. Variables should be separated by Comma
B. Capital A is not allowed
C. Only one variable should be given
D. All of these

___**5.**Which of the following correctly declares an array?
A. int array[10]; B. int array; C. array{10}; D. array array[10];

___**6.**What is the index number of the last element of an array with 9 elements?
A. 9 B. 8 C. 0 D. Programmer-defined

___**7.**What is the output of this fragmented code? {char str [5] = "ABC"; cout << str [2];}
A. ABC B. A C. C D. B

___**8.** How many minimum numbers of functions need to be presented in c++?
A. 0 B. 1 C. 2 D.3

___**9.**What will happen when we use void in argument passing?
A. It will not return value to its caller
B. It will return value to its caller
C. both a & b are correct
D. none of the mentioned

___**10.**Where does the return statement returns the execution of the program?
A. main function B. caller function C. same function D. none of the menti

___11.What is the output of the following fragmented C++ code?

{int n; float x = 4.8;n = int(x)/2; cout << "n = " << n << endl;}

A. 4.8 B. 2.4 C. 2 D. 2.

___12.Which operator is having the highest precedence?

A. postfix B. unary C. shift D. equality

___13.What is the output of the following fragmented code?

for (int n=5; n>0;n--);

{if (n==3);continue; cout << n ;}

A. 54321 B. 5432 C. 543 D. 5421

___14.Where does the execution of the program starts?

A. user-defined function B. main function C. void function D. None

___15.What are mandatory parts in function declaration?

A. return type, function name
B. return type, function name, parameters
C. both a and b
D. none of the mentioned

___16.The break statement causes an exit

A. From the innermost loop or switch
B. Only from the innermost switch
C. Only from the innermost loop
D. Terminates a program

___17. When will we use the function overloading?

A. same function name but different number of arguments
B. different function name but same number of arguments
C. same function name but same number of arguments
D. different function name but different number of arguments

___18.Float mark [5] = {10.5, 6.7, 13.6, 5.1}; is an example of

A. Initializing array B. Initializing variable
C. Initializing functions D Accessing array values

___19.From question 21, what is the value of mark [4]?

A. 13.6 B.6.7 C.5.1 D None

___20. What will happen while using pass by reference

A. The values of those variables are passed to the function so that it can manipulate th
B. The location of variable in memory is passed to the function so that it can use the sa memory area for its processing
C. The function declaration should contain ampersand (& in its type declaration)
D. All

___11.What is the output of the following fragmented C++ code?

{int n; float x = 4.8;n = int(x)/2; cout << "n = " << n << endl;}

A. 4.8 B. 2.4 C. 2 D. 2.2

___12.Which operator is having the highest precedence?

A. postfix B. unary C. shift D. equality

___13.What is the output of the following fragmented code?

for (int n=5; n>0;n--);

{if (n==3);continue; cout << n ;}

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___14.Where does the execution of the program starts?

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B. return type, function name, parameters
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___19.From question 21, what is the value of mark [4]?

A. 13.6 B.6.7 C.5.1 D None

___20. What will happen while using pass by reference

A. The values of those variables are passed to the function so that it can manipulate them
B. The location of variable in memory is passed to the function so that it can use the same memory area for its processing
C. The function declaration should contain ampersand (& in its type declaration)
D. All

Part II: **For questions 1-4:** Write is the output of the following c++ programs.

1. [3pts]

```
#include<iostream>
using namespace std;
int  main(){
int i,j;
for(i=1;i<=5;i++)
{for(j=1;j<=i;j++)
cout<<"*";
cout<<"\n";
}
return 0;
}
```

Q#1. Answer

2. [3pts]

```
#include<iostream>
using namespace std;
float data(float i, float j, float k)
{   i+=j+k;
return i;  }
void number(float &i, float &j,float &k)
{   i=data(i,j,k);
}
int main(){
float x=1.1, y=1.2, z=1;
number(x,y,z);
cout <<x<< endl;
cout<< y<<endl;
cout<< z<<endl;
}
```

Q#2. Answer

3. [4pts]

```
#include <iostream>
#include<cstring>
using namespace std;
int main() {
string k="FacultyofElectrical";
int array[8]={2,6,7,9};
for(int i=0;i<8;i++)
{
if (array[i]>4)
cout<<k[9];
else
cout<<array[i];
}
return 0; }
```

Q#3. Answer

4. [4pts]

```
#include <iostream>
#include<cstring>
using namespace std;
int main(){
int len1,len2,len3,len4;
char message1[100]="You are expected
join";
char message2[100]=" Electrical Engine
len1=strlen(message1);
len2=strlen(message2);
cout<<len1<<endl;
cout<<len2<<endl;
string concate=strcat(message1,messa
cout<<concate<<endl;
int compare=strcmp(message1,messa
cout<<compare<<endl;
 return 0;}
```

Q#4. Answer

Part III: ***For questions A and B:*** *Rewrite the following programs after removing the syntactical errors (if any). Underline each correction and then write the output.*

A. [4pts]

```
#include<iostream>
using namespace std;
float Average(float, float)
int main()
{
float r=3.3,g=1.2,ave;
ave=Average(r;g);
cout<<ave<<endl;
return 0;
 }
float Average(float x, float y);
 {
float ave= =(x+y)/2;
 }
```

Solution

B. [4pts]

```
#include <iostream>
using namespace std;
int main ()
{
int foo [3] = {16, 2, 77, 40, 71};
int i, result=0;
 for ( i=0 ,i<5 , i++ )
 {
  result += foo[i];
 }
 cout << result;
 return 0;
 }
```

Solution

PART IV:

1. Write a Complete C++ program that receives 10 elements for an array to find and print the multiplication result of all the given 10 elements.**[4pts]**
2. Write a c++ program to read 10 integers from the keyboard in the range 0 - 100, and count how many of them are larger than 50, and display the result.**[4pts]**

fstream both

Part I: Answer the following questions accordingly. (6 pts)

1. What is the difference between sequential and random files? 1) sequential means it is orderly
   random files is a file which is not orderly.
2. What is the importance of using a structure?
3. What is the meaning of writing **#include<fstream>** in a program? it orders our program to do both writing & reading

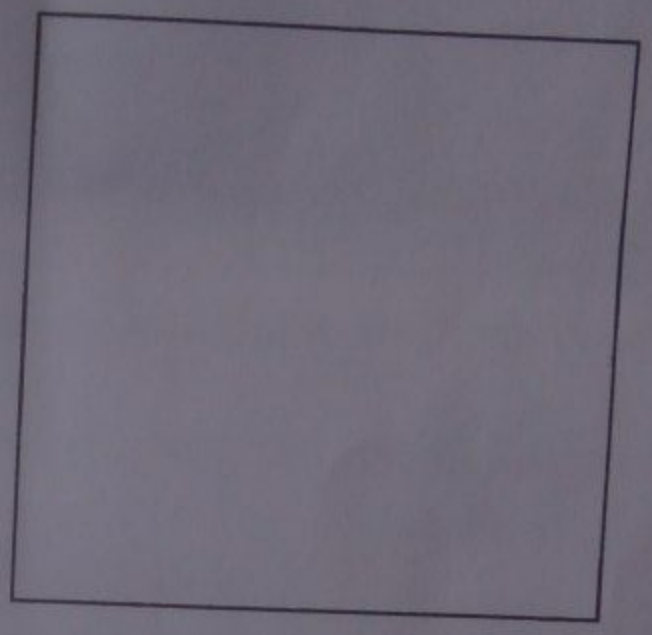
Part II: Determine the output of the following programs. (12 pts)

1.
```
#include <iostream>
using namespace std;
int main()
{
   int list[8];
   for (int i = 1; i< 8; i++)
   {

list[i] = 2 * i + 5;
if (i % 2 == 0)
list[i] = list[ i] - 3;
else
cout<<list[i]<<endl;
}
```

2.
```
#include<iostream>
using namespace std;
int main( )
{
int myArr[2][4];
for(int i=0;i<2;i++)
{
for(int j=0;j<4;j++)
{
myArr[i][j]=(i+j)+(i*j);

cout<<myArr[i][j]<<" ";

}

cout<<endl;

}

return 0;

}
```

3.

```
#include <iostream>
using namespace std;
int main()
{
int x,y;
int * p = &x;
int * q = &y;
x = 25;
y = 46;
p = q;
* p = 68;
(*p)++;
*p=*q;
cout<< x << " " << y <<endl;
cout<< * p << " " << * q <<endl;
   return 0;
}
```



x	y
68	46

p q

~~46~~ 46

68

* p = q

*p = &x

*q = &y

*p = 25

*q = 46

p = q;

p = 46

q = 46

*p = 68

(*p)++

Part III: Program writing (22 pts)

1. Write a C++ program that declares an array named **alpha** of 10 components of type **double**. Initialize the array so that the first 5 components are equal to the square of their index, and the last 5 components are equal to three times of their index. Print the first 5 elements in one line and the last 5 elements in the second line.
2. Given the following array, myArray[]={10,7,25,14,52,31,15,9,62,22,5}, write a c++ program that:
    a. Adds even elements of the array and print the result
    b. Adds elements of the array, which are found at odd index and prints the result.

3. Write a program that declares a structure named **player** to store the data of a baseball player (**player's name, number of home runs, and number of hits**). Declare an array of 10 components to store the data of 10 baseball players. Your program must contain a function to input data and a function to output data.

    Use the following function declaration:

    void ***input*** (player [], int);

    void ***display*** (player [], int);

4. Assume that you have a text file named **list** with the following content.
    i. Binyam Hailu
    ii. Alemu Gizaw

    Write a program to add three more names (Hiwot zeleke, Shambel Frede, Tamirat Sintayehu) to the file.