This project is to review important topics related to programming. We will be working on this during class to help you study for future exams.

Programming Fundamentals

The process of converting source code into an executable file that can be run is known as:	
A code block is:	
A syntax error is:	
A logic error is:	
A run-time error is:	

Data Types

Which data type can store whole numbers, including positive, negative, and zero, but nothing with a decimal or fraction portion?	
Which data type can store whole numbers or numbers with decimals, including positive, negative, and zero?	
Which data type only stores true or false?	
Which data type can store anything within it, but the contents must be contained within double quotes “”?	
A run-time error is:	

Operators

Label the following operators:

+	-	*	/	%
++	–	==	!=	>
>=	&&	||	!	=
+=	-=	*=	/=	

Variables

The scope of a variable refers to:	
To declare a variable, you must at least specify these two things about the variable:	
A local variable is:	

Boolean Expressions

If A is true and B is true, then the result of **`A && B`** is:

If A is true and B is false, then the result of **`A && B`** is:

If A is true and B is false, then the result of **`A || B`** is:

If A is false and B is false, then the result of **`A || B`** is:

A symbolizes: n > 10
B symbolizes: n < 100
If n is 0, what is the result of **`A && B`**?

A symbolizes: n > 10
B symbolizes: n < 100
If n is 20, what is the result of **`A && B`**?

A symbolizes: n > 10
B symbolizes: n < 100
If n is 20, what is the result of **`A || B`**?

If Statements

Within an if statement's parenthesis ( ), a question is being asked. The term for this "question" is:

For the following code, which statement will get PRINTed?

```
bool quit = true;
if ( !quit )
   PRINT( "Hello" );
else
   PRINT( "Goodbye" );
```

For the following code, which statement will get PRINTed?

```
int x = 10;
if ( x < 10 || x > 20 )
   PRINT( "Result A" );
else
   PRINT( "Result B" );
```

While Loops

Within an while statement's parenthesis ( ), a question is being asked. The term for this "question" is:
(same as if statement)

Step through the following While Loop, logging the values of the variables each cycle through.

```
int a = 0;
while (a < 10)
{
   a += 2;
}
cout << "Result: " << a << endl;
```

When	Value of "a" (at end of cycle)
Before the loop begins	0
First iteration of the loop	
Second iteration of the loop	
Third iteration of the loop	
Fourth iteration of the loop	
Fifth iteration of the loop	
After the loop ends	

Step through the following While Loop, logging the values of the variables each cycle through. Note that % is the modulus operator. The statement "a % 2 == 0" is just asking if a is **even**.

```
int a = 0, b = 0;

while (a < 10 && b < 10)
{
    a++;
    if (a % 2 == 0)
    {
        b += 5;
    }
    cout << a << "\t" << b << endl;
}

cout << "after: " << a
    << "\t" << b << endl;
```

When	Value of "a"	Value of "b"
Before the loop begins	0	0
1st iteration		
2nd iteration		
3rd iteration		
4th iteration		
After the loop ends		

For Loops

Within a for loop's ( ) parentheses, three things are defined. What are they?

1.
2.
3.

Step through the following For Loops, logging the variable values each time.

```
for ( int i = 0; i < 5; i++ )
{
   cout << i << ",";
}
```

When	Value of "i"
1st Iteration	
2nd Iteration	
3rd Iteration	
4th Iteration	
5th Iteration	

* Because this *i* is defined within the ( ) of the for-loop, it is only within scope **inside** the for loop, and does not exist after the for loop ends.

```
for ( int i = 5; i >= 0; i-- )
{
   cout << i << ",";
}
```

When	Value of "i"
1st Iteration	
2nd Iteration	
3rd Iteration	
4th Iteration	
5th Iteration	
6th Iteration	

How come this loop has 6 iterations, but the one above has 5?

```
for (int i = 1; i <= 100; i *= 2 )
{
   cout << i << ",";
}
```

When	Value of "i"
1st Iteration	
2nd Iteration	
3rd Iteration	
4th Iteration	
5th Iteration	
6th Iteration	
7th Iteration	

What happens if *i* begins at 0?

```
for (int y = 1; y <= 3; y++)
{
   for (int x = 1; x <= 2; x++)
   {
      cout << "x * y = "
         << x * y << endl;
   }
}
```

When	x	y	x*y
1st Iteration			
2nd Iteration			
3rd Iteration			
4th Iteration			
5th Iteration			
6th Iteration			

With a nested for loop, does the inner loop or the outer loop finish its cycle first?

Arrays

What is an index?

What is an element?

What rules apply to arrays?

1. All elements of an array must be:
2. We must manually keep track of:
3. Arrays cannot be:
4. The size of the array must be known at:

If a variable can be declared of some data-type, can an array of that data-type also be declared?

Arrays in C++, Java, and C# begin at index: