READ THIS NOW!

Failure to read and follow the instructions below may result in severe penalties.
Failure to adhere to these directions will not constitute an excuse or defense.

- Print your name & email address in the spaces provided below.
- Print your name and Va Tech ID number (NOT your SSN) on the Opscan form; be sure to code your ID number on the Opscan form. Code Form B on the Opscan.
- Choose the single best answer for each question — some answers may be partially correct. If you mark more than one answer, it will be counted wrong.
- Unless a question involves determining whether given C++ code is syntactically correct, assume that it is. The given code has been compiled and tested, except where there are deliberate errors. Unless a question specifically deals with compiler #include directives, you should assume the necessary header files have been included.
- Note that questions about printed values disregard formatting completely.
- In questions/answers which require a distinction between integer and real values, integers will be represented without a decimal point, whereas real values will have a decimal point, [1044 (integer), 1044.0 (real)].
- When you have finished, sign the pledge at the bottom of this page and turn in the test and your Opscan.
- This is a closed-book, closed-notes examination. No calculators or other electronic devices may be used during this examination. You may not discuss (in any form: written, verbal or electronic) the content of this examination with any student who has not taken it. You must return this test form when you complete the examination. Failure to adhere to any of these restrictions is an Honor Code violation.
- Mark your answers on the test form, for future reference, and on the Opscan. The answers you mark on the Opscan form will be considered your official answers.
- There are 35 multiple-choice questions.

Do not start the test until instructed to do so!

Name ____________________________________________ (print: Last name, First)

VT PID: __________________________________________ (print: campus email address)

Pledge: On my honor, I have neither given nor received unauthorized aid on this examination.

__________________________

signature
The incomplete code below is intended to process an input stream containing a float value, followed by a space and a single char which must be either an ‘F’ for Fahrenheit or a ‘C’ for Celsius; indicating the scale of the temperature. The code must determine which type of temperature has been read and convert it to the other scale, printing out the converted temperature.

```cpp
float temp, celsius, fahrenheit;
char scale;
iFile >> temp >> scale;
fahrenheit = (9.0/5.0) * (temp + 32.0);
celsius = (5.0/9.0) * (temp - 32.0);
if (scale _______ 'F') // line 1
  cout << _______________; // line 2
else ________________ // line 3
  cout << _______________; // line 4
else
cout << "Invalid temperature scale symbol.";
```

1) In order for this code to perform as described above, the blank in line 1 should be filled with:
   1) ==  2) =  3) !=  4) <<  5) None of these

2) In order for this code to perform as described above, the blank in line 2 should be filled with:
   1) fahrenheit << 'F'  2) celsius << 'C'
   3) fahrenheit - celsius << 'F'  4) celsius - fahrenheit << 'C'
   5) None of these

3) In order for this code to perform as described above, the blank in line 3 should be filled with:
   1) Nothing at all  2) (scale != 'F')
   3) if (scale == 'C')  4) if (scale == 'C')
   5) None of these

4) In order for this code to perform as described above, the blank in line 4 should be filled with:
   1) fahrenheit << 'F'  2) celsius << 'C'
   3) fahrenheit - celsius << 'F'  4) celsius - fahrenheit << 'C'
   5) None of these
5) What is the value of the variable Z after the following code is executed?

```cpp
int W = 5, X = 9, Y = 5, Z = 1;
if (X % Y >= W - Z) {
    Z--;
    if (Y-3*W >= -X)
        Z++;
    else
        Z--;
} else {
    Z = 3;
}
```

1) -1  2) 0  3) 1  4) 2  5) 3  6) None of these

6) What output will the following code fragment produce?

```cpp
void main( ) {
    int grade = 91, level = -3;
    if (grade >= 90)
        if (level <= -2)
            cout << "A-level";
        else
            cout << "B-status";
}
```

1) A-level  2) B-status  3) "A-level"  4) "B-status"  5) both 1 and 2  6) both 3 and 4  7) No output is produced

For the next 2 questions, consider execution of the following switch statement:

```cpp
int Enter = 0;
cin >> Enter;

switch (Enter) {
    case 1: Enter = -4;
    case 2: Enter = -6;
    case 4: break;
    case 6: Enter = -8;
        break;
    default: Enter = -1;
}
```

What would the value of Enter be after execution of this code if the value read for Enter were:

<table>
<thead>
<tr>
<th>Enter</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>7)</td>
<td>1</td>
<td>-1</td>
<td>-4</td>
<td>-6</td>
<td>-8</td>
<td>10  none of these</td>
</tr>
<tr>
<td>8)</td>
<td>6</td>
<td>-1</td>
<td>-4</td>
<td>-6</td>
<td>-8</td>
<td>10  none of these</td>
</tr>
</tbody>
</table>
For the following 4 questions, suppose the (file) input stream `In` contains the following 5 lines of data (there's one tab character between columns and a newline character immediately after the last character on each line):

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>23</td>
<td>72</td>
<td>40</td>
<td>Gomer</td>
</tr>
<tr>
<td>17</td>
<td>30</td>
<td>95</td>
<td>28</td>
<td>Goober</td>
</tr>
<tr>
<td>6</td>
<td>34</td>
<td>82</td>
<td>66</td>
<td>Opie</td>
</tr>
<tr>
<td>19</td>
<td>62</td>
<td>36</td>
<td>21</td>
<td>Floyd</td>
</tr>
<tr>
<td>8</td>
<td>49</td>
<td>45</td>
<td>33</td>
<td>Bea</td>
</tr>
</tbody>
</table>

What is the value of each of the indicated variables after the execution of the following program segment?

```c++
int Zero = 0, One = 1, Two = 2, Three = 3, Four = 4;
string First = "Andy", Second = "Barney";

In >> Zero >> One >> Two;
In.ignore(100, '\n');
In >> Two >> One >> Zero;
In >> Four;
In.ignore(100, '\t');
In >> First;
In.ignore(100, '\n');
In >> Second;
```

9) Zero 55 72 30 95 none of these
10) Four 40 28 30 17 none of these
11) First "\t" "Goober" "Opie" "6" none of these
12) Second "Opie" "6" "6" "34" none of these

13) Which of the following in Polya’s 4-step process is the second thing to do?
   1) Devise a plan  
   2) Write C code  
   3) Understand the problem  
   4) Test the plan  
   5) Post a forum message  
   6) Call 4-HELP

14) Which of the following is NOT a computer language level?
   1) Machine  
   2) Octal  
   3) Assembly  
   4) high-level  
   5) None of the above

15) A program that executes but produces wrong results contains what type of error(s):
   1) logic errors  
   2) execution errors  
   3) syntax errors  
   4) undeclared identifiers  
   5) compilation errors  
   6) none of the above
For the next two questions, assume the input file stream \texttt{iFile} is connected to an input file whose contents are:

\begin{verbatim}
 2b 0r !2b
\end{verbatim}

(There's a single tab separating the 'b' from the '0' (zero) and another single tab separating the 'r' from the '!'.)

Consider execution of the following code fragment immediately after the file stream has been opened:

\begin{verbatim}
  int i1 = 0, i2 = 1, i3 = 2;
  char ch1 = 'x', ch2 = 'y', ch3 = 'z';
  iFile >> i1;
  iFile >> ch1;
  iFile >> i2;
  iFile >> ch2;
  iFile.get(ch3);
\end{verbatim}

16) The resulting value of the variable \texttt{ch1} would be:

\begin{tabular}{cccc}
  1) '\n' & 2) '!' & 3) '2' & 4) 'b' \\
  5) ' ' (a space) & 6) '0' & 7) '\t' & 8) None of these
\end{tabular}

17) The resulting value of the variable \texttt{i2} would be:

\begin{tabular}{cccc}
  1) '\n' & 2) '!' & 3) 2 & 4) 'b' \\
  5) ' ' (a space) & 6) 0 & 7) '\t' & 8) None of these
\end{tabular}

18) The resulting value of the variable \texttt{ch3} would be:

\begin{tabular}{cccc}
  1) '\n' & 2) '!' & 3) 2 & 4) 'b' \\
  5) ' ' (a space) & 6) 0 & 7) '\t' & 8) None of these
\end{tabular}

For the following 4 questions, select the value of the given C++ arithmetic expression. Note that the presence of a decimal indicates a double value, rather than an int.

\begin{tabular}{cccccc}
  1) & 2) & 3) & 4) & 5) \\
  19) & 8 / 5 + 3 & 1 & 4 & 4.0 & 4.6 & none of the above \\
  20) & 18.0 / 6.0 + 6.0 & 1.0 & 1.5 & 9.0 & 9 & none of the above \\
  21) & 11 % 4 + 1 & 3 & 3.75 & 4 & 4.0 & none of the above \\
  22) & 7.1 * 3 - 1 & 14 & 14.2 & 20 & 20.3 & none of the above \\
\end{tabular}
23) What is the value printed for the variable Delta if the following code is executed?

```cpp
int Delta = -1, X = 3;
if ( X / 2 == 1 )
    Delta = Delta + X;
X--;
if ( X / 2 == 0 )
    Delta = Delta + X;
X--;
if ( X / 2 == 0 )
    Delta = Delta + X;
cout << "Delta = " << Delta << endl;
```

1) 1  2) 2  3) 3
4) 4  5) 5  6) 6
7) 0  8) none of these

For the following 4 questions, assume the following variable declarations and initializations:

```cpp
bool james, dickens, bronte, austen=false;
int a = -3, b = 4, c = 0;
```

Determine the value assigned by each of the following C++ statements to the relevant Boolean variable, or if there's something (syntactically) wrong with the expression. Choose from the following answers:

1) true  2) false  3) syntax error

24) james = a - 6 < 2 * -b ;
25) dickens = (b % 2 >= c);
26) bronte = (a * -2 == b + 2) && (b * c != 4) || (a * c > 0);
27) austen = (c + 4 != b || b / 3 > c + 1);
28) int I = 1, L = 7;
if (J > K) {
    I = 2;
} else {
    L = I*2;
}

Which of the following code fragments is equivalent to the code above? "Equivalent" means that each code fragment would assign the same values to I and L as the code given above, given the same initial values for the variables J and K.

1) int I = 1, L = 7;  2) int I = 1, L = 7;
if (J < K) {                  if (J <= K) {
    L = I*2;}                     L = I*2;
} else {                        else {
    I = 2;}     I = 2;
} 3) int I = 1, L = 7;  4) int I = 1, L = 7;
if (J >= K) {                  if (J > K) {
    I = 2;}                       L = I*2;
} else {                        else {
    L = I*2;}     I = 2;
} 5) more than one is equivalent    6) none is equivalent

For the next 3 questions, select the value logically assigned to the relevant variable, given the declarations:

int IntVar;
double FloatVar;

29) FloatVar = 9 % 4;  1  2  3  4  5
1  1.0  2  2.0 none of the above

30) FloatVar = 16 / 2.5;  6.0  6.4  8.0  10.0 none of the above

31) IntVar = 15 - 5.8 ;  9  9.2  10  10.0 none of the above
For the next 4 questions, assume the input file stream Fred is connected to an input file whose contents are:

```
3.14 2.71828 43 0 27
24 1.8 -12 3 5 1 8
45.738 17.9 19 32 91
```

(There's a newline character at the end of each line, and a single space separating values on the same line.) Consider execution of the following code fragment immediately after the file stream has been opened:

```cpp
int anInt1, anInt2, anInt3, anInt4;
float aFloat1, aFloat2;
cout << fixed << showpoint;
Fred >> aFloat1 >> anInt1;
cout << aFloat1 << anInt1; // 23
Fred.ignore(100, '\n');
Fred.ignore( 5, '\n');
Fred >> anInt1 >> aFloat2 >> anInt3;
Fred.ignore( 80, '\n');
cout << anInt1 << setprecision(1) << aFloat2 << anInt3; // 24, 25
Fred >> aFloat2;
cout << setprecision(2) << aFloat2; // 26
```

32) In the statement labeled 23, the value printed for the variable `anInt1` would be:

1) 3  
2) 24 
3) -12
4) 0  
5) 1  
6) 45
7) 2  
8) 8  
9) none of these

33) In the statement labeled 24, the value printed for the variable `aFloat2` would be:

1) 1.8 
2) 3.0 
3) 8.0 
4) 0.8 
5) 5.0 
6) -12
7) -12.0 
8) 51.0 
9) none of these

34) In the statement labeled 25, the value printed for the variable `anInt3` would be:

1) 43 
2) 24 
3) -12
4) 0  
5) 1  
6) 45
7) 27 
8) 8  
9) none of these

35) In the statement labeled 26, the value printed for the variable `aFloat2` would be:

1) 45 
2) 45.73 
3) 46
4) 45.0 
5) 45.74 
6) 46.0
7) 45.7 
8) 45.738 
9) none of these