1. Fill the blanks in the definitions below with the appropriate terms.

   compilation is the process of translating programs written in a high level language to the machine language.

   testing typically refers to executing a program on different inputs to check if the program produces the expected results.

   implementation is the process of translating a high level specification of an algorithm into a program written in a programming language.

   debugging is the process of removing errors from a program.

   linking is the process of creating an executable file from multiple object files.

2. (a) What are the five main components of a computer?
   input devices, output devices, processor, main memory, secondary memory

   (b) What are the three main kinds of program errors?
   syntax errors, run-time errors, logic errors

   (c) What kind of errors does the compiler discover?
   syntax errors

   (d) What are the steps of the software life cycle?
   (requirements) analysis and specification, design, implementation, testing, maintenance

   (e) What is a byte and what is a bit?
   A bit is a binary digit.

   A byte is a 8 bit portion of a memory.
3.

(a) Declare and initialize two integer variables named `count` and `sum` to zero.

```c
int count=0, sum=0;
```

(b) Declare and initialize two variables, one `int` and one `double`. Initialize the `int` variable to two and initialize the `double` variable to three and a half.

```c
int var1 = 2;
double var2 = 3.5;
```

4. Given the following declarations, show the result of evaluating the following expressions (write True or False to denote the result).

```c
int x = 3, y = 5; double z = 6.0;
```

<table>
<thead>
<tr>
<th>Expression</th>
<th>Result? (True or False)</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>x + y - 2.5 &lt; z</code></td>
<td>True</td>
</tr>
<tr>
<td><code>y + x * 2 / 4 &gt; z</code></td>
<td>False</td>
</tr>
<tr>
<td>!(y + x &gt;= z - x + 3)</td>
<td>False</td>
</tr>
<tr>
<td>`y &gt; z &amp;&amp; x + 2 == y</td>
<td></td>
</tr>
<tr>
<td><code>y - 1 - 1 + x == z++</code></td>
<td>True</td>
</tr>
</tbody>
</table>

5. For each of the program segments listed below, indicate if they contain a syntax error or not (write Yes if compiler will report an error and No otherwise).

```c
int int1, double_2 = 1;
int 1x;
int i, j, x; if (i != j) x=x+1;
int x, y; if (x==2) x=0; else x=1; else y=x;
int i = 1, sum = 0; while (i <= 10) { sum += i; i++; }
```

<table>
<thead>
<tr>
<th>Program Segment</th>
<th>Compiler error? (Yes or No)</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>int int1, double_2 = 1;</code></td>
<td>No</td>
</tr>
<tr>
<td><code>int 1x;</code></td>
<td>Yes</td>
</tr>
<tr>
<td><code>int i, j, x; if (i != j) x=x+1;</code></td>
<td>No</td>
</tr>
<tr>
<td><code>int x, y; if (x==2) x=0; else x=1; else y=x;</code></td>
<td>Yes</td>
</tr>
<tr>
<td><code>int i = 1, sum = 0; while (i &lt;= 10) { sum += i; i++; }</code></td>
<td>No</td>
</tr>
</tbody>
</table>

6. (a) Write an output statement that prints the string "Enter a value :".

```c
cout << "Enter a value :";
```

(b) Write an input statement that places a value in the variable `input_value`.

```c
cin >> input_value;
```

(c) Write an output statement that produces a newline.

```c
cout << endl;
```

7. Write an if-else statement that outputs the word Big if the value of the variable `score` is greater than 1000 and Small if the value of score is at most 1000. The variables are of type `int`.

```c
if (score > 1000) { cout << "Big"; } else { cout << "Small"; }
```
if (score > 1000)
    cout << "Big";
else
    cout << "Small";

8. Write an if-else statement that outputs the word Ready provided that either the value of the variable temperature is greater than or equal to 160, or the value of the variable time is greater than or equal to 90, or both. Otherwise, the if-else statement outputs the word Cooking. The variables are of type int.

if (temperature >= 160 || time >= 90)
    cout << "Ready";
else
    cout << "Cooking";

9. Show the output of this code:

int x = 15;
while (x > 0)
{
    cout << x << endl;
    x = x - 4;
}

15
11
7
3

10. What will be the values of the variables i, j, c1 and c2 at the end of the following program segment?

    int i = 0, j = 0, c1 = 0, c2 = 0;
    while (i < 4)
    {
        c1++;
        j = 0;
        while (j < i)
        {
            c2++;
            j++;
        }
        i++;
    }
    // what are the values of i, j, c1 and c2 here?