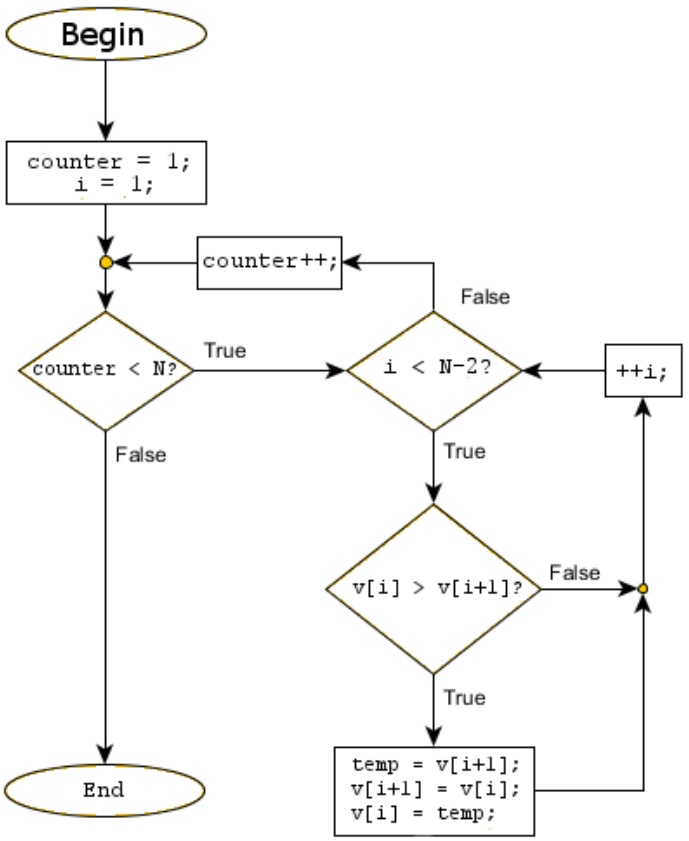
1. Consider the flow chart for applying the bubble-sort algorithm for sorting objects that can be put in order.

   (a) Tabulate values for the `counter`, `i` and the current state of `vector<char> v={ a,l,g,o,r,i,t,h,m}`.

i	counter	v
1	1	{ a,l,g,o,r,i,t,h,m}
⋮	⋮	⋮

   (b) Write a C++ function that implements the algorithm.

   (c) How many times is the comparison `v[i] > v [i+1]` made in sorting { `a,l,g,o,r,i,t,h,m`} ?



2. Explain how and why the following program does what it does:

```
int main() {
    int a = 10;
    while(a<11) {
        int a = 12;
        cout << "\na = " << a;
        cin.get();
    }
}
```

3. Write a `class` named `Commodity` with data fields `string id; double unitPrice, inStock, sold;` and a member functions that include a constructor and a function `revenue()` that computes and returns the `unitPrice*sold`. In `main()` write a loop that allows the user to enter various `Commodities` into a `vector` of `Commodities` like, say, bananas, indicating the `id`, the `unitPrice`, the amount `inStock`, and the amount `sold`. Then compute the total revenue from all those `commoditys` and the total value `inStock`.

   Submit this as `<your initials_midterm2_3.cpp` by email.

4. Write a program that reads every other word of a text into a new file whose filename is supplied by the user. Execute this on the poem at http://geofhagopian.net/CS007A/cs7A-s15/scooping.txt into a new file. Submit both the file and its text file output on printout paper.

5. Consider the code below:

```
const char name = 'a'; // name token
const char let = 'L'; // declaration token
const string declkey = "let"; // declaration keyword
Token Token_stream::get() {
  if (full) {
    full = false;
    return buffer;
  }
  char ch;
  cin >> ch;
  switch (ch) {
  case quit: case print: case '(': case ')': case '+':
  case '-': case '*': case '/': case '%':
  return Token{ch}; // let each character represent itself
  case '.': // a floating-point-literal can start with a dot
  case '0': case '1': case '2': case '3': case '4':
  case '5': case '6': case '7': case '8': case '9': // numeric literal
  { cin.putback(ch); // put digit back into the input stream
    double val;
    cin >> val; // read a floating-point number
    return Token{'8',val}; // let '8' represent ``a number"
  }
  if (isalpha(ch)) {
    cin.putback(ch);
    string s;
    cin>>s;
    if (s == declkey) return Token(let); // declaration keyword
    return Token{name,s};
  }
  default:
    error("Bad token");
  }
}
```

(a) What is the name of the function defined here?

(b) What is the scope of this function?

(c) The function handles input from the console. Describe, in step by step detail, how it would handle the console input

`"let GC = 6.67384e-11"`