MICROSOFT TECHNICAL INTERVIEW QUESTIONS WITH ANSWERS

1. **Should variables be stored in local blocks?**

ANS- The use of local blocks for storing variables is unusual and therefore should be avoided, with only rare exceptions. One of these exceptions would be for debugging purposes, when you might want to declare a local instance of a global variable to test within your function. You also might want to use a local block when you want to make your program more readable in the current context.

Sometimes having the variable declared closer to where it is used makes your program more readable. However, well-written programs usually do not have to resort to declaring variables in this manner, and you should avoid using local blocks.

2. **How could you determine if a linked list contains a cycle in it, and, at what node the cycle starts?**

ANS- Assume that the node definition contains a boolean flag, bVisited.

```
struct Node
{
  ...
  bool bVisited;
};
```

Then, to determine whether a node has a loop, you could first set this flag to false for all of the nodes:

```
// Detect cycle
// Note: pHead points to the head of the list (assume already exists)
Node *pCurrent = pHead;
while (pCurrent)
{
  pCurrent->bVisited = false;
  pCurrent = pCurrent->pNext;
}
```

Then, to determine whether or not a cycle existed, loop through each node. After visiting a node, set bVisited to true. When you first visit a node, check to see if the node has already been visited (i.e., test bVisited == true). If it has, you've hit the start of the cycle!

```
bool bCycle = false;
pCurrent = pHead;
while (pCurrent && !pCycle)
{
  if (pCurrent->bVisited == true)
    // cycle!
    pCycle = true;
  else
  {
    pCurrent->bVisited = true;
    pCurrent = pCurrent->pNext;
  }
}
```

3. **What is a "trigger"?**

ANS- Triggers are stored procedures created in order to enforce integrity rules in a database. A trigger is executed every time a data-modification operation occurs

(i.e., insert, update or delete). Triggers are executed automatically on occurrence of one of the data-modification operations. A trigger is a database object directly associated with a particular table. It fires whenever a specific statement/type of statement is issued against that table. The types of statements are inserted, update, delete and query statements. Basically, trigger is a set of SQL statements a trigger is a solution to the restrictions of a constraint.

4. **What is "index covering" of a query?**

ANS- Index covering means that the Data can be found only using indexes, without touching the tables.

5. **What is a "functional dependency"? How does it relate to database table design?**

ANS- Functional dependency relates to how one object depends upon the other in the database. For example, procedure/function sp2 may be called by procedure sp1. Then we say that sp1 has functional dependency on sp2.

6. **What is a Join?**

ANS- Join used to connect two or more tables logically with or without common field.

7. **What is "Normalization" and “Denormalization"? Why do you sometimes want to denormalize?**

ANS- Normalizing data means eliminating redundant information from a table and organizing the data so that future changes to the table are easier.

Denormalization means allowing redundancy in a table. The main benefit of denormalization is improved performance with simplified data retrieval and manipulation. This is done by reduction in the number of joins needed for data processing.

8. **What types of index data structures can you have?**

ANS- An index helps to faster search values in tables. The three most commonly used index-types are: - B-Tree: builds a tree of possible values with a list of row IDs that have the leaf value. Needs a lot of space and is the default index type for most databases.

Bitmap: string of bits for each possible value of the column. Each bit string has one bit for each row.