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#include <iostream>

using namespace std;

class BloomFilter
{
public:
   bool arr[100];
   int filter_size;
   int filter;
   BloomFilter(int n)
   {
      filter_size = n;
      for(int i=0;i<filter_size;i++)
      {
         arr[i] = false;
      }
      filter = 0;
```

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}

int hash1(string s)
{
   int hash_val=0;
   for(unsigned int i=0;i<s.length();i++)
   {
      hash_val = hash_val+(int)s[i];
   }
   hash_val = hash_val%filter_size;
   return hash_val;
}

int hash2(string s)
{
   int hash_val=0;
   for(unsigned int i=0;i<s.length();i++)
   {
      hash_val = hash_val+((int)s[i] * 3);
   }
   hash_val = hash_val%filter_size;
   return hash_val;
}

int hash3(string s)
{
   int hash_val=0;
   for(unsigned int i=0;i<s.length();i++)
   {
      hash_val = hash_val+((int)s[i] * 5);
   }
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    hash_val = hash_val%filter_size;
    return hash_val;
}

int hash4(string s)
{
    int hash_val=0;
    for(unsigned int i=0;i<s.length();i++)
    {
        hash_val = hash_val+((int)s[i] * 7);
    }
    hash_val = hash_val%filter_size;
    return hash_val;
}

void search_data(string s)
{
    int hv1 = hash1(s);
    int hv2 = hash2(s);
    int hv3 = hash3(s);
    int hv4 = hash4(s);

    cout<<"\n Using array \n";
    cout<<"\n Hash1 : "<<hv1<<"     Hash2 : "<<hv2<<"     Hash3 : "<<hv3<<"     Hash4 :"<<hv4;

    cout<<endl;
    for(int i=0; i<filter_size;i++)
    {
        cout<<"   "<<i;
    }
```

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cout<<endl;
for(int i=0; i<10;i++)
{
   cout<<"   "<<arr[i];
}
for(int i=10; i<filter_size;i++)
{
   cout<<"    "<<arr[i];
}

if(arr[hv1] == true && arr[hv2] == true && arr[hv3] == true && arr[hv4] == true)
{
   cout<<"\nThe data " <<s<<" may be present";
}
else
{
   cout<<"\nThe data " <<s<<" is not present.  It is inserted in the filter";
   arr[hv1] = true;
   arr[hv2] = true;
   arr[hv3] = true;
   arr[hv4] = true;

   cout<<endl;
   for(int i=0; i<filter_size;i++)
   {
      cout<<"   "<<i;
   }

   cout<<endl;
   for(int i=0; i<10;i++)
   {
```

```
        cout<<"   "<<arr[i];
      }
      for(int i=10; i<filter_size;i++)
      {
        cout<<"    "<<arr[i];
      }
    }
}

void search_data1(string s)
{
    int hv1 = hash1(s);
    int hv2 = hash2(s);
    int hv3 = hash3(s);
    int hv4 = hash4(s);

    cout<<"\n\n\n Using variable \n";
    int shift_val1 = 1 << (hv1 - 1);
    int shift_val2 = 1 << (hv2 - 1);
    int shift_val3 = 1 << (hv3 - 1);
    int shift_val4 = 1 << (hv4 - 1);

    cout<<"\n Hash1 : "<<hv1<<"     Hash2 : "<<hv2<<"     Hash3 : "<<hv3<<"     Hash4 :"<<hv4;

    cout<<endl;
    for(int i=filter_size; i>9;i--)
    {
      cout<<"   "<<i;
    }
    for(int i=9; i>0;i--)
    {
```

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    cout<<"    "<<i;
  }

  cout<<endl;

  int temp_val = filter;
  int ctr = 32;
  //cout<<endl;
  while(ctr>0)
  {
    int t = temp_val;
    t = t >> (ctr - 1);
    t = t & 1;
    cout<<"    "<<t;
    ctr--;
  }

  if(((filter & shift_val1) >0) && ((filter & shift_val2) >0) && ((filter & shift_val3) >0) && ((filter & shift_val4) >0))
  {
    cout<<"\nThe data " <<s<<" may be present";
  }
  else
  {
    cout<<"\nThe data " <<s<<" is not present.  It is inserted in the filter";
    filter = filter | shift_val1;
    filter = filter | shift_val2;
    filter = filter | shift_val3;
    filter = filter | shift_val4;

    cout<<endl;
```

```
        for(int i=filter_size; i>9;i--)
        {
           cout<<"   "<<i;
        }
        for(int i=9; i>0;i--)
        {
           cout<<"    "<<i;
        }

        cout<<endl;
        ctr = 32;
        while(ctr>0)
        {
           int t = filter;
           t = t >> (ctr - 1);
           t = t & 1;
           cout<<"    "<<t;
           ctr--;
        }
      }
   }
};
int main()
{
   BloomFilter b(32);
   string s;
   int ch;

   cout<<"\n The size of integer is : "<<sizeof(int);
   while(1)
   {
```

```
        cout<<"\n Enter the data : ";
        cin>>s;
        b.search_data1(s);
        //b.search_data1(s);
        cout<<"\n\n\n Do you want to enter other data :";
        cin>>ch;
        if(ch==0)
            break;
    }
    return 0;
}
```