## 1.0 Occucoder Query Interfaces - General Information

This document describes Occucoder 2.7's query interfaces in a relatively short, easy to read way. Section 1 gives an overview of queries and responses, as well as suggested methods for sampling them to get some hands-on familiarity. Section 2 describes all the supported queries along with their query parameters. Section 3 provides an example response for each kind of query. Section 4 provides the file names for the response schemas, which are available at the *schema* relative URL.

#### 1.1 Queries

Occucoder recognizes a number of queries. All queries are standard HTML requests. Using a POST type request is recommended, but Occucoder will also respond to a GET type request. All requests should be encoded as MIME type *application/x-www-form-urlencoded*. Responses will normally have a MIME type of *application/xml* (this value can be changed - see the User Guide or the Install Guide).

**NOTE:** Versions prior to v2.5 had a response MIME type of application/atom+xml.

Because Occucoder recognizes GET requests, it is possible to type a query into the address bar of a browser. For example, this query asks for occupations matching the title *farmer*:

```
http://localhost:8080/occucoder/codes?title=farmer
```

Requests also can be made using command line programs such as wget or curl:

```
[C:\]wget.exe http://localhost:8080/occucoder/codes?title=farmer
```

Wget stores the response as a file. The file can be handed off to a display program, as in the following example (wrapped to fit the page, but must be all on one line):

```
[C:\]wget -O occ.xml http://localhost:8080 /occucoder/codes?title=farmer &
"C:\Program Files\XMLmind XML Editor\bin\xxe.exe" occ.xml
```

In the above example, wget saves the response to a file named *occ.xml*, and the program xxe (the XMLMind XML editor) is then invoked to open the file. These examples are for Windows; commands will be similar for most linux shells.

Occucoder ignores any parameters it does not recognize. This makes Occucoder robust against errors in requests. Most request parameters have default values, and most of the defaults can be changed by editing a configuration file (context.xml).

### 1.1.1 Character Encoding

Occucoder queries must use UTF-8 encoding. For English-only queries these are the same bytes of data as US ASCII or Western European (ISO-8859-1) characters, but the query encoding should be specified as UTF-8. For Spanish-language queries, the encoding **must** be in UTF-8, and the response will use that encoding too.

### 1.1.2 Mixed Characters and Languages

Occucoder expects that Spanish language queries will use accented characters (e.g., "á"). Queries that use unaccented versions of accented characters, or that use mixed English and Spanish, may produce responses of reduced quality.

### 1.2 Responses

All responses from Occucoder are XML documents<sup>1</sup>; all conform to the ATOM format, which allows extra elements to be inserted from non-ATOM namespaces. Since ATOM, like RSS, is a news

<sup>1</sup> As of Version 2.7, the response to an standard occupation query can have an optional text format.

syndication format, most news reader programs will be able to display the responses. But they may not show all the information, since they don't know about the additional elements that Occucoder inserts.

Since the responses are basically lists, they are fairly easy to parse to extract the data or to reformat for display.

### 1.2.1 Character Encoding

Occucoder responses are encoded in UTF-8.

## 2.0 Specific Queries

#### 2.1 Standard Occupation Query

This is the most common Occucoder query. It accepts a job title optional job description, and some other optional parameters, and returns a list of O\*Net-SOC occupations that appear to be reasonable matches for the query. The response contains, for each occupation, the O\*Net-SOC occupation code, title, description, and match score. Optionally, it can also contain information on Green or Bright Outlook occupation ratings². If the title contains only a partial occupation code, such as 11-20, Occucoder will return all occupations whose codes match 11-20\*, where '\*' is used to denote a match to any or all characters.

Occucoder recognizes queries directed to the relative URL **occucoder/codes** for this query type. The following table describes the recognized parameters; Occucoder will ignore unrecognized parameters.

Some development systems can generate query code automatically using a Web Services Description Language (WSDL) file. Such code may not be able to omit optional parameters, such as the maxitems parameter, and may initialize them to o or an empty string. For certain such parameters, in particular maxitems and minscore, Occucoder will treat a value of o or an empty string as the standard default value. In effect, this provides a way to omit optional values by simply not setting them, even though the code may actually transmit the initialized value.

Parameter Name	Standard Default *	Description	
title	" "	An occupation title	
desc	11 11	Text describing the duties of the occupation	
format	atom	Optional format for the response to a Standard Occupation Query. Use "text" for the text format. Any other value will use the default value, whis is normally "atom" but may be set in the <i>context.xml</i> configuration file.	
maxitems	6	Maximum number of items in the response	
minscore	20	All response items must have at least this high a score	
logthis	false	If true or checked, log this query	
logresponse	false	If <i>true</i> or <i>checked</i> , include the responses in the query log entry.	
nomatch_code	11 11	Code to return if no matches were found (e.g., 99-9999.99)	
requester	""	String identifying the user, to appear in the the logged query (if any)	
requester_app	""	String identifying the requesting application, to appear in the logged query (if any)	
green	false	If true or checked, include "Green Jobs" data items for each	

The optional text format will not contain "green" or "bright Outlook" information. In this format, fields are separated by tab characters. There is no WSDL file for this text format.

		occupation returned
bright	false	If <i>true</i> or <i>checked</i> , include "Bright Outlook Jobs" data items for each occupation returned
lang	""	If $sp$ , queries and responses will be in Spanish. Otherwise English will be used.

#### 2.2 Database Version Query

This query type is provided as a convenience, to make it easy to determine the O\*Net database version in use. When a Standard Occupation Query (Section 2.1) is made that includes the parameter *dbversion*, with the value either *true or checked*, then Occucoder will return the version of the database being used. Any other query parameters will be ignored.

### 2.3 Green Occupations By Sector Query

The O\*Net Center has linked some occupations with various "Green Occupation" sectors and categories. This type of query shows which occupations are linked to a specified sector or all sectors, optionally filtered by category.

Occucoder recognizes queries directed to the relative URL **occucoder/green/bysector** for this query type. The following table describes the recognized parameters; Occucoder will ignore unrecognized parameters.

Parameter Name	Standard Default *	Description	
sector	*	A sector ID value, or '*', denoting all sector ID values. If omitted, treated as '*'	
cat	NA	A category ID value, used to filter the results	

<sup>\*</sup> NA indicates "Not Applicable".

The ID values are strings such as *gso* (for a Green Sector) or *gc1* (for a Green Category). A list of all the sector and category ID values along with their titles can be obtained using a **Green Jobs Sector/Category Query** as described below in Section 2.4.

The *lang* parameter indicating Spanish is the same as for the Standard Occupational Query, given in Section 2.1.

### 2.4 Green Jobs Sector/Category Query

This query type is provided to return a list of the known Green Jobs sectors and categories. Occucoder recognizes queries directed to the relative URL **occucoder/green** for this query type. Except for the *lang* parameter, no parameters are recognized, and any parameters present are ignored.

The *lang* parameter indicating Spanish is the same as for the Standard Occupational Query, given in Section 2.1.

## 2.5 Bright Outlook Occupations By Category

The O\*Net Center has linked some occupations with various "Bright Outlook" categories. This type of query shows which occupations are linked to a specified category, or all categories.

Occucoder recognizes queries directed to the relative URL **occucoder/bright/bycat** for this query type. The following table describes the single recognized parameter; Occucoder will ignore unrecognized parameters.

Parameter Name	Standard Default *	Description	
cat	NA	A category ID value, or '*', denoting all category values. If omitted, treated as '*'.	

<sup>\*</sup> NA indicates "Not Applicable".

The *lang* parameter indicating Spanish is the same as for the Standard Occupational Query, given in Section 2.1.

The ID values are strings such as bco. A list of all the category ID values along with their titles can be obtained using a **Bright Outlook Jobs Category Query** as described below in Section 2.7.

### 2.6 Bright Outlook Jobs Category Query

This query type is provided to return a list of the known Bright Outlook Jobs categories. Occucoder recognizes queries directed to the relative URL **occucoder/bright** for this query type. Except for the *lang* parameter, no parameters are recognized, and any parameters present are ignored.

The *lang* parameter indicating Spanish is the same as for the Standard Occupational Query, given in Section 2.1.

#### 2.7 Military Occupation Code Query

The O\*Net Center provides a data set that links some Military Occupation Codes (MOCs) to O\*Net-SOC occupations. Not all MOCs are so linked. This type of query provides a list of linked occupations (if any) given an MOC. Because some MOCs are used by different services to mean very different occupations, Occucoder lets you optionally specify the branch of service (e.g., army), and the military personnel category (e.g., enlisted) to narrow down the possibilities.

Occucoder recognizes queries directed to the relative URL **occucoder/moc** for this query type. The following table describes the recognized parameters; Occucoder will ignore unrecognized parameters.

Parameter Name	Standard Default *	Description	
moc	NA	mandatory MOC value (e.g., 11B)	
svc	NA	Denotes the branch of military service. Recognized values and what they denote (e.g., A denotes Army):	
		A - Army C - Coast Guard F - Air Force M - Marines N - Navy P - Navy Commissioned/Warrant Officer Designator Code S - Navy Commissioned Officer Subspecialty Code The parameter value is not case-sensitive.	
mpc	NA	Denotes the Military Personnel Category (enlistment level). Recognized values and what they denote:  E - Enlisted O - Commissioned Officer W - Warrant Officer  The parameter value is not case-sensitive.	

\* NA indicates "Not Applicable".

If the *moc* parameter is missing from the query, then Occucoder returns an HTTP error with code 400 indicating that the parameter is required but missing. If either of the codes *svc* or *mpc* are present but do not have one of the values listed in the above table, then Occucoder returns an HTTP error with code 400 indicating that the parameter does not have a recognized value.

The Spanish language flag *lang* is ignored if present, since U.S. Military occupation titles are automatically in English.

#### 3.0 Example Query Responses

### 3.1 Standard Occupation Query

```
<?xml version="1.0" encoding="utf-8"?>
<?xml-stylesheet type="text/css" href="std occ query.css"?>
<feed xmlns="http://www.w3.org/2005/Atom"</pre>
      xmlns:itsc='http://itsc.org/occucoder/'>
   <title>0*Net-SOC Occupation Codes</title>
   <id>http://itsc.org/codeburner/feed/id/occ-code-list/238540117</id>
   <updated>2007-05-02T04:33:48-05:00</updated>
   <author><name>Occucoder</name></author>
   <itsc:query-title>engineer</itsc:query-title>
      <title>Traffic Technicians</title>
      <id>http://itsc.org/codeburner/entry/id/5/2/2007T4:28:18</id>
      <updated>2007-05-02T04:33:48-05:00/updated>
      <content type='application/xml'>
         <itsc:jobcode>53-6041.00</itsc:jobcode>
         <itsc:jobtitle>Traffic Technicians</itsc:jobtitle>
         <itsc:jobdescrip>Conduct field studies to determine traffic volume, speed,
effectiveness of signals, adequacy of lighting, and other factors influencing traffic
conditions, under direction of traffic engineer.</itsc:jobdescrip>
         <itsc:score>100</itsc:score>
      </content>
   </entry>
   <entry>
      <title>Locomotive Firers</title>
      <id>http://itsc.org/codeburner/entry/id/5/2/2007T4:59:42</id>
      <updated>2007-05-02T04:33:48-05:00</updated>
      <content type='application/xml'>
         <itsc:jobcode>53-4012.00</itsc:jobcode>
         <itsc:jobtitle>Locomotive Firers</itsc:jobtitle>
         <itsc:jobdescrip>Monitor locomotive instruments and watch for dragging
equipment, obstacles on rights-of-way, and train signals during run. Watch for and relay
traffic signals from yard workers to yard engineer in railroad yard.</itsc:jobdescrip>
         <itsc:score>100</itsc:score>
      </cont.ent.>
   </entry>
</feed>
```

### 3.11 Optional Text Format

**NOTE:** Long lines are wrapped in this document, but are not wrapped in the actual response. The three fields are tab-separated. The MIME type of the response is *text/plain*.

- 100 53-5031.00 Ship Engineers Supervise and coordinate activities of crew engaged in operating and maintaining engines, boilers, deck machinery, and electrical, sanitary, and refrigeration equipment aboard ship.
- 100 53-4011.00 Locomotive Engineers Drive electric, diesel-electric, steam, or gas-turbine-electric locomotives to transport passengers or freight. Interpret train orders, electronic or manual signals, and railroad rules and regulations.
- 100 41-9031.00 Sales Engineers Sell business goods or services, the selling of which requires a technical background equivalent to a baccalaureate degree in engineering.
- 100 17-2199.09 Nanosystems Engineers Design, develop, or supervise the production of materials, devices, or systems of unique molecular or macromolecular composition, applying principles of nanoscale physics and electrical, chemical, or biological engineering.
- 100 17-2199.08 Robotics Engineers Research, design, develop, or test robotic applications.
- 100 17-2199.07 Photonics Engineers Design technologies specializing in light information or light energy, such as laser or fiber optics technology.

### 3.2 Green Occupations Sector/Category Query

```
<?xml version="1.0" encoding="utf-8"?>
<?xml-stylesheet type="text/css" href="lister.css"?>
<feed xmlns='http://www.w3.org/2005/Atom'
   xmlns:itsc='http://itsc.org/occucoder/'>
    <id>http://itsc.org/codeburner/feed/id/13cbbbf/1316205246/946936</id>
    <updated>2011-09-16T14:34:06Z</updated>
    <author><name>Occucoder</name></author>
    <title>0*Net-SOC Green Jobs Category/Sector List</title>
    <entry>
        <title>Green Jobs Sectors</title>
        <id>http://itsc.org/codeburner/entry/id/13cbbbf/1316205246/887917</id>
        <updated>2011-09-16T14:34:06Z</updated>
        <content type='application/xml'>
            <itsc:greenSector>
                <itsc:id>gs0</itsc:id>
                <itsc:name>Agriculture and Forestry</itsc:name>
            </itsc:greenSector>
            <itsc:greenSector>
                <itsc:id>gs7</itsc:id>
                <itsc:name>Manufacturing</itsc:name>
            </itsc:greenSector>
            <itsc:greenSector>
                <itsc:id>qs8</itsc:id>
                <itsc:name>Recycling and Waste Reduction</itsc:name>
            </itsc:greenSector>
            <itsc:greenSector>
                <itsc:id>gs9</itsc:id>
                <itsc:name>Renewable Energy Generation</itsc:name>
            </itsc:greenSector>
       </content>
    </entry>
    <entry>
        <title>Green Jobs Categories</title>
        <id>http://itsc.org/codeburner/entry/id/13cbbbf/1316205246/879088</id>
        <updated>2011-09-16T14:34:06Z</updated>
        <content type='application/xml'>
            <itsc:greenCat>
                <itsc:id>gc0</itsc:id>
                <itsc:name>Green Enhanced Skills</itsc:name>
            </itsc:greenCat>
            <itsc:greenCat>
                <itsc:id>ac1</itsc:id>
                <itsc:name>Green Increased Demand</itsc:name>
            </itsc:greenCat>
            <itsc:greenCat>
                <itsc:id>gc2</itsc:id>
                <itsc:name>Green New &amp; Emerging</itsc:name>
            </itsc:greenCat>
       </content>
    </entry>
</feed>
```

## 3.3 Green Occupations By Sector Query

```
<?xml version="1.0" encoding="utf-8"?>
<?xml-stylesheet type="text/css" href="lister.css"?>
<feed xmlns='http://www.w3.org/2005/Atom'</pre>
    xmlns:itsc='http://itsc.org/occucoder/'>
    <title>O*Net-SOC Occupation List For Green Sector(s)</title>
    <id>http://itsc.org/codeburner/feed/id/8a4156/1316728846/511567</id>
    <updated>2011-09-22T16:00:45Z</updated>
    <author><name>Occucoder</name></author>
    <entry>
        <title>Occupation Codes for Green Jobs Sector gs1</title>
        <id>http://itsc.org/codeburner/entry/id/8a4156/1316728846/827608</id>
        <updated>2011-09-22T16:00:45Z</updated>
        <content type='application/xml'>
            <itsc:occupation>
                <itsc:jobcode>11-1021.00</itsc:jobcode>
                <itsc:jobtitle>General and Operations Managers</itsc:jobtitle>
            </itsc:occupation>
            <itsc:occupation>
                <itsc:jobcode>13-2051.00</itsc:jobcode>
                <itsc:jobtitle>Financial Analysts</itsc:jobtitle>
            </itsc:occupation>
            <itsc:occupation>
                <itsc:jobcode>17-2071.00</itsc:jobcode>
                <itsc:jobtitle>Electrical Engineers</itsc:jobtitle>
            </itsc:occupation>
            <itsc:occupation>
                <itsc:jobcode>17-2141.00</itsc:jobcode>
                <itsc:jobtitle>Mechanical Engineers</itsc:jobtitle>
            </itsc:occupation>
            <itsc:occupation>
                <itsc:jobcode>49-9021.01</itsc:jobcode>
                <itsc:jobtitle>Heating and Air Conditioning Mechanics and
Installers</itsc:jobtitle>
            </itsc:occupation>
            <itsc:occupation>
                <itsc:jobcode>53-6051.07</itsc:jobcode>
                <itsc:jobtitle>Transportation Vehicle, Equipment and Systems Inspectors,
Except Aviation</itsc:jobtitle>
            </itsc:occupation>
        </content>
    </entry>
</feed>
```

## 3.4 Military Occupation Code Query

```
<?xml version="1.0" encoding="utf-8"?>
<?xml-stylesheet type="text/css" href="lister.css"?>
<feed xmlns='http://www.w3.org/2005/Atom'</pre>
    xmlns:itsc='http://itsc.org/occucoder/'>
   <id>http://itsc.org/codeburner/feed/id/1a28182/1316204031/425507</id>
   <updated>2011-09-16T14:13:50Z</updated>
   <author><name>Occucoder</name></author>
   <title>O*Net-SOC MOC data</title>
   <entry>
      <title>0*Net Occupations</title>
      <id>http://itsc.org/codeburner/entry/id/1a28182/1316204031/617087</id>
      <updated>2011-09-16T14:13:50Z</updated>
      <content type='application/xml'>
         <itsc:svc>M</itsc:svc>
         <itsc:mpc>E</itsc:mpc>
         <itsc:moc>0111</itsc:moc>
         <itsc:moc title>Administrative Specialist</itsc:moc title>
         <itsc:occupation>
            <itsc:onet>43-9022.00</itsc:onet>
            <itsc:title>Word Processors and Typists</itsc:title>
         </itsc:occupation>
         <itsc:occupation>
            <itsc:onet>43-9061.00</itsc:onet>
            <itsc:title>Office Clerks, General</itsc:title>
         </itsc:occupation>
      </cont.ent.>
   </entry>
   <entry>
      <title>0*Net Occupations</title>
      <id>http://itsc.org/codeburner/entry/id/la28182/1316204031/416113</id>
      <updated>2011-09-16T14:13:50Z</updated>
      <content type='application/xml'>
         <itsc:svc>N</itsc:svc>
         <itsc:mpc>W</itsc:mpc>
         <itsc:moc>0111</itsc:moc>
         <itsc:moc title>Dermatologist</itsc:moc title>
         <itsc:occupation>
            <itsc:onet>29-1069.00</itsc:onet>
            <itsc:title>Physicians and Surgeons, All Other</itsc:title>
         </itsc:occupation>
      </content>
   </entry>
   <entry>
      <title>0*Net Occupations</title>
      <id>http://itsc.org/codeburner/entry/id/1a28182/1316204031/691530</id>
      <updated>2011-09-16T14:13:50Z</updated>
      <content type='application/xml'>
         <itsc:svc>N</itsc:svc>
         <itsc:mpc>O</itsc:mpc>
         <itsc:moc>0111</itsc:moc>
         <itsc:moc title>Dermatologist</itsc:moc title>
         <itsc:occupation>
            <itsc:onet>29-1069.00</itsc:onet>
            <itsc:title>Physicians and Surgeons, All Other</itsc:title>
         </itsc:occupation>
      </content>
   </entry>
</feed>
```

## 3.5 Bright Outlook Jobs Category Query

```
<?xml version="1.0" encoding="utf-8"?>
<?xml-stylesheet type="text/css" href="lister.css"?>
<feed xmlns='http://www.w3.org/2005/Atom'</pre>
    xmlns:itsc='http://itsc.org/occucoder/'>
    <id>http://itsc.org/codeburner/feed/id/1b1a986/1316400709/211694</id>
    <updated>2011-09-18T20:51:49Z</updated>
    <author><name>Occucoder</name></author>
    <title>0*Net-SOC Bright Outlook Jobs Category List</title>
    <entry>
        <title>Bright Outlook Jobs Category List</title>
        <id>http://itsc.org/codeburner/entry/id/1b1a986/1316400710/526827</id>
        <updated>2011-09-18T20:51:49Z</updated>
        <content type='application/xml'>
            <itsc:brightCat>
                <itsc:id>bc0</itsc:id>
                <itsc:name>Numerous Job Openings</itsc:name>
            </itsc:brightCat>
            <itsc:brightCat>
                <itsc:id>bc1</itsc:id>
                <itsc:name>Rapid Growth</itsc:name>
            </itsc:brightCat>
            <itsc:brightCat>
                <itsc:id>bc2</itsc:id>
                <itsc:name>New and Emerging</itsc:name>
            </itsc:brightCat>
       </content>
    </entry>
</feed>
```

## 3.6 Bright Outlook Occupations By Category Query

```
<?xml version="1.0" encoding="utf-8"?>
<?xml-stylesheet type="text/css" href="lister.css"?>
<feed xmlns='http://www.w3.org/2005/Atom'
    xmlns:itsc='http://itsc.org/occucoder/'>
    <title>O*Net-SOC Occupation List For Bright Outlook Category</title>
    <id>http://itsc.org/codeburner/feed/id/df9252/1316728555/57726</id>
    <updated>2011-09-22T15:55:54Z</updated>
    <author><name>Occucoder</name></author>
    <entry>
        <title>Occupation Codes for Bright Outlook Category: Category bc1</title>
        <id>http://itsc.org/codeburner/entry/id/df9252/1316728555/391717</id>
        <updated>2011-09-22T15:55:54Z</updated>
        <content type='application/xml'>
            <itsc:occupation>
                <itsc:jobcode>11-9039.00</itsc:jobcode>
                <itsc:jobtitle>Education Administrators, All Other</itsc:jobtitle>
            </itsc:occupation>
            <itsc:occupation>
                <itsc:jobcode>11-9039.01</itsc:jobcode>
                <itsc:jobtitle>Distance Learning Coordinators</itsc:jobtitle>
            </itsc:occupation>
            <itsc:occupation>
                <itsc:jobcode>11-9039.02</itsc:jobcode>
                <itsc:jobtitle>Fitness and Wellness Coordinators</itsc:jobtitle>
            </itsc:occupation>
            <itsc:occupation>
                <itsc:jobcode>13-1011.00</itsc:jobcode>
                <itsc:jobtitle>Agents and Business Managers of Artists, Performers, and
Athletes</itsc:jobtitle>
            </itsc:occupation>
            <itsc:occupation>
                <itsc:jobcode>49-9062.00</itsc:jobcode>
                <itsc:jobtitle>Medical Equipment Repairers</itsc:jobtitle>
            </itsc:occupation>
            <itsc:occupation>
                <itsc:jobcode>51-8031.00</itsc:jobcode>
                <itsc:jobtitle>Water and Wastewater Treatment Plant and System
Operators</itsc:jobtitle>
            </itsc:occupation>
        </content>
    </entry>
</feed>
```

## 4.0 Schemas

Schemas for the Occucoder query responses are supplied in two formats: RELAX NG compact syntax (rnc), and XML Schema (xsd). The rnc format is easier to read and understand, while the xsd format is supported by more automated tools. The single rnc schema, *occucoder.rnc*, contains subschemas for all queries. For XML Schema schemas, however, there is a separate schema file for each type of query response, plus two auxiliary schemas the are imported by the others.

The schemas are provided in the *schema* directory of the installation CD, and also in the *schema* directory in the installed occucoder directory tree. This makes it easy to provide their location to an automated IDE such as Visual Studio.

The xsd schema file names and their respective queries are as follows:

Schema Name	Query Type	Reference Section
stdOccQuery.xsd	Standard Occupation Query	2.1
moc.xsd	Military Occupation Code Query	2.7
greenCat.xsd	Green Occupations Sector/Category Query	2.4
greenBySector.xsd	Green Occupations By Sector Query	2.3
brightCat.xsd	Bright Outlook Jobs Category Query	2.6
brightByCat.xsd	Bright Outlook Occupations By Category	2.5

The xsd schemas can be retrieved from Occuoder at URLs like the following:

http://localhost:8080/occucoder/schema/xsd/moc.xsd

(change *localhost* and *8080* to match your installation). The RELAX NG schema uses the file *occucoder.rnc*. This single files contains schemas for all the query types. The RELAX NG schema can be retrieved from a URL like

http://localhost:8080/occucoder/schema/relax/occucoder.rnc