A VISUAL BASIC PROGRAM FOR SERCHING FILES IN A CDS ASTRONOMICAL CATALOGUES

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Abstract

An algorithm was designed for searching a specify files within the astronomical catalogues, a program (in visual basic language) has been written to make a survey for an astronomical radio sources. This program gives the user a facility to access to any word on any text file in the catalogue.

The program includes six searching cases, searching for any word, searching for frequency unit like (MHz), searching for specific values of frequency between minimum and maximum values, searching for declination words, searching for right ascension words, searching for journals, and Searching for authors.

The data files for this program were loaded from website of CDS catalogue internet web site, 85 files for radio sources are loaded in our system as a first data collection to establish our system memory bank .This memory can be updated this data by adding more files to our system. A test for the program was carried out in all searching cases.

برنامج بلغة الفجوال بيسك للبحث في ملفات جداول فلكية من نوع CDS

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الخلاصة

صُمم برنامج للبحث عن ملفات معينة في جداول فلكية،(كُتب البرنامج بلغة الفجوال بيسك) لعمل مسح للمصادر الفلكية الراديوية، يقدم هذا البرنامج تسهيلات للمستخدم للوصول لاي كلمة في اي ملف في الجدول. تضمن هذا البرنامج ست حالات للبحث، البحث عن اي كلمة و البحث عن وحدة تردد مثل (MHZ) و البحث في قيم معينة للتردد بين قيمة عليا و قيمة دنيا و البحث عن كلمات البعد الزاوي و كلمات المطلع المستقيم. بيانات الملفات لهذا البرنامج أُخذت من شبكة الانترنت من موقع CDS catalogue، ٨٦ ملف للمصادر الراديوية حُملت الى نظامنا كمجموعة اولى لتأسيس ذاكرة لنا، يمكننا ان نُحدث هذ الذاكرة بأضافة المزيد من الملفات الى نظامنا. ان اختبار هذا البرنامج نُفذ عن طريق هذه الحالات الستة.

Introduction

Since 1950 to present time, many astronomical catalogues are arranged to collected the astronomical observations date (such as 1C, 2C, 3C, 3CR[1], CDS). Each such catalogue has it special information arranged, so a search program through these catalogue files was used to enable the astronomical user to select any information from such catalogue in this research. CDS catalogue has been chosen to design its search program, the files of this catalogue were studied and classified them information in six groups (word, emission

frequency, declination, right ascension, author, and journal).
The visual basic language was selected to write research program for its communication facility between the user and computer.

CDS catalogue

Many astronomical sources in our universe are emitting radio electromagnetic radiation [2] at different frequencies such as radio galaxies, black holes, pulsars, neutron stars, some planets in our solar system (sun, Jupiter), and other cosmic objects.
In this research CDS catalogues files were used as a data base for testing our program. This catalogue including an information about any source such as its position (Right Ascension (RA), Declination (DEC)), flux density radiation, observation, authors, observation published journals.
The first version of this document was published as the paper adopted standards for catalogues at CDS published in the bulletin d'information du center donnees astronomiques de Strasbourg (BICDS).
Version 1.4 of the document was dated 12 September 1994, and result from discussion with ADS colleagues, mainly N. Paul kuin.Common conventions the standard filename conventions -ReadMe as the description file, extensions .dat for the data files——and the basic label definitions.
Version 1.5 is dated 12 June 1996, and contained a few more convention on file names and label definitions.
Version 2.0 is dated February 2000, and resulted from discussions with G. Schwarz (AAS, Tucson). Each catalogue available at CDS is made of several files stored in a directory of a Unix-like file system.
The directory tree naming conventions exactly follow the standards adopted at CDS in the mid 70's, astronomical catalogue has been assigned a chronological number in categories numbered I to IX (see table 1) reflecting the main scientific interest of the catalogue; this numbering system is shared by the CDS and the participating data center, mainly NSSDS-ADC (astronomical data center at NASA space science data center) [3].

Before the program designed a full study for CDS catalogue files, such as data, important and interesting information we need. These files contain many astronomical information like: the names of astronomical radio sources like galaxies or quasars…..etc, the names of observatories, the frequencies of radio emission radio sources, right ascension and declination for these sources, flux density, the longitude and latitude of the observed sky, journals names and the names of authors.

Program algorithm

This algorithm has been designed to execute a six searching cases within all files of CDS catalogue. These files were collected and loaded from internet web site of this catalogue; figure (1) explained the flowchart of this program.
Visual basic language was chosen [4], to execute this algorithm for the reason that this program language has the capability of making a communication window between the user and computer. Figure (2) explain the main program execution window, where the user can be select any desired catalogues, which is interested. The radio catalogue type (VIII) is used in propose program only as shown in figure (3). The all files in this catalogue, 85 files are loaded from website of CDS catalogue. These files were carried out rearrangement and then they were saved as text files. The execution windows for six searching cases explained in the figures (4), (5), (6), (7), (8), and (9).

CDS catalogue files contents

Table 1: Directory tree of catalogues at CDS [3]

I/number Astrometric Catalogues II/number Photometric Catalogues (except Radio) III/number Spectroscopic Catalogues IV/number Cross-Identifications V/number Combined Data VI/number Miscellaneous Catalogues VII/number Non-stellar Objects VIII/number Radio Catalogues IX/number High Energy Catalogues
J/abbr/Volume/fiest page Publications ordered by Journals, with abbr: A+A = A&A A+AS = A&A Suppl. AJ = Astron. J. ApJ = Astrophys. J. ApJS = Astrophys. J. Suppl. MNRAS = Mon. Not. R. Astron. Soc. PASP = Publ. Astron. Soc. Pacific AZh = Astron. Zhurnal (Russia) PAZh = Pis'ma Astron. Zhurnal (Russia) Other = Form J/other/abbr/Volume._rst page = for other journals, abbr being written as the bibcodea

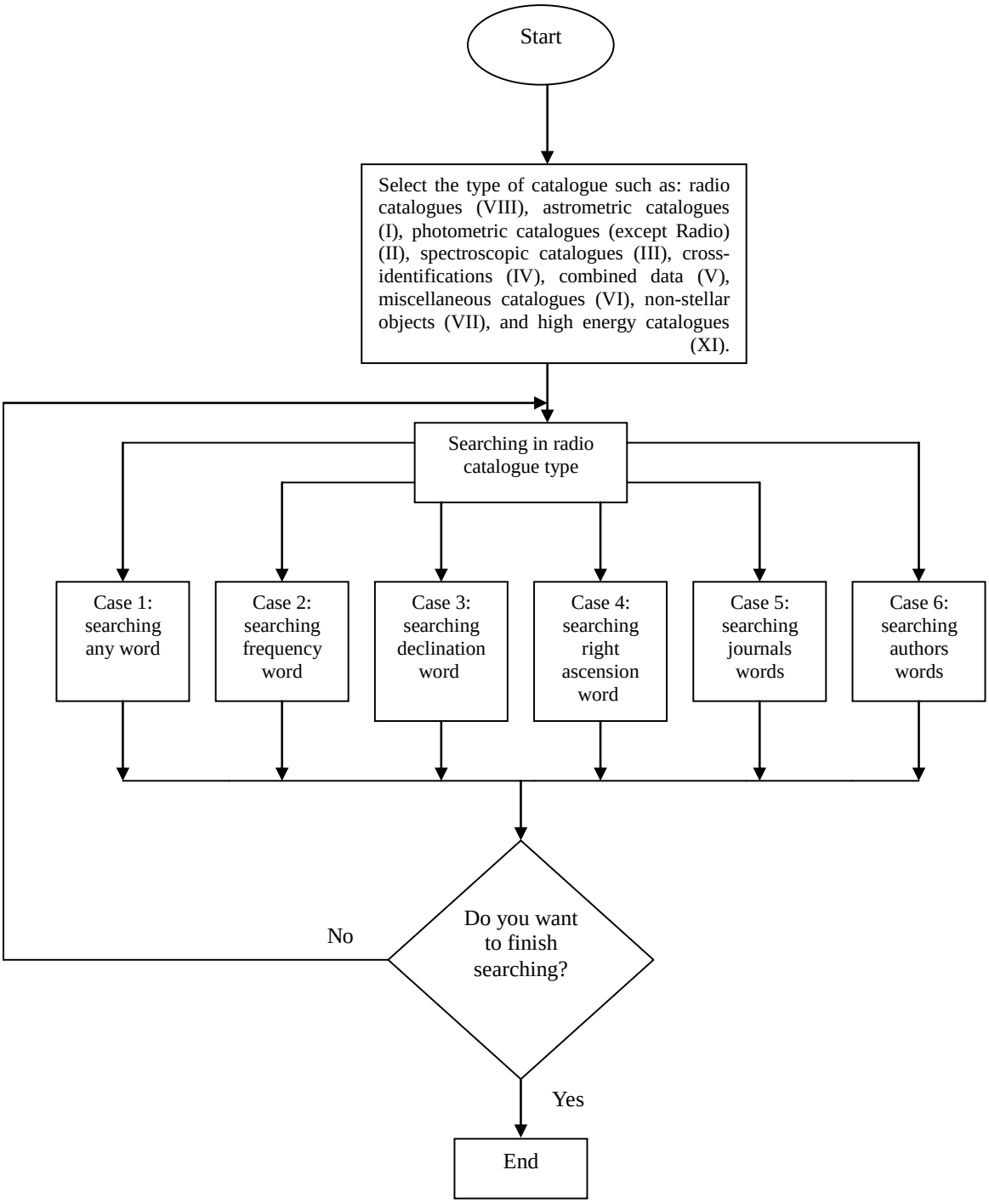


Figure 1: the proposed program flowchart.

Figure 2: the main program window.

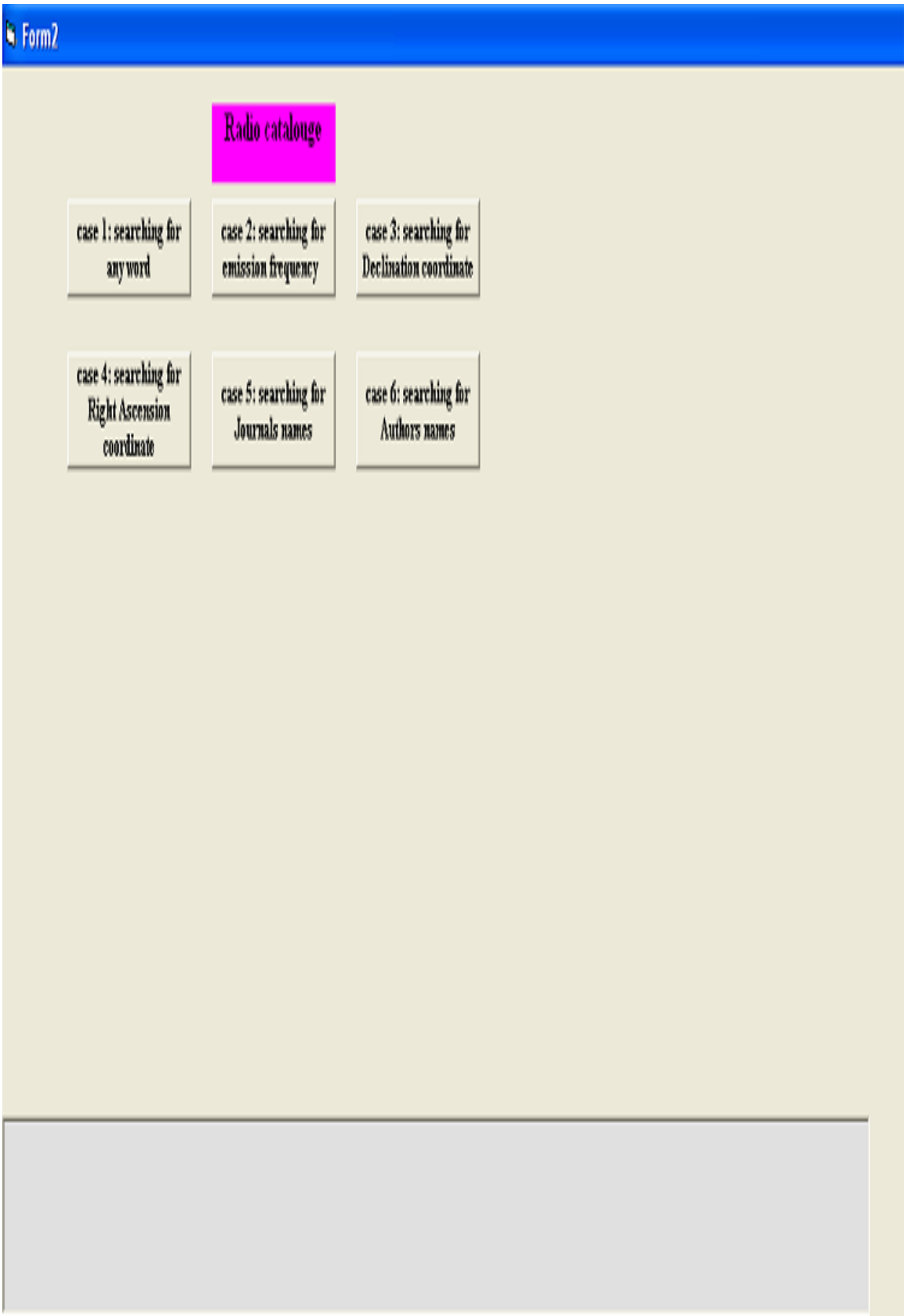
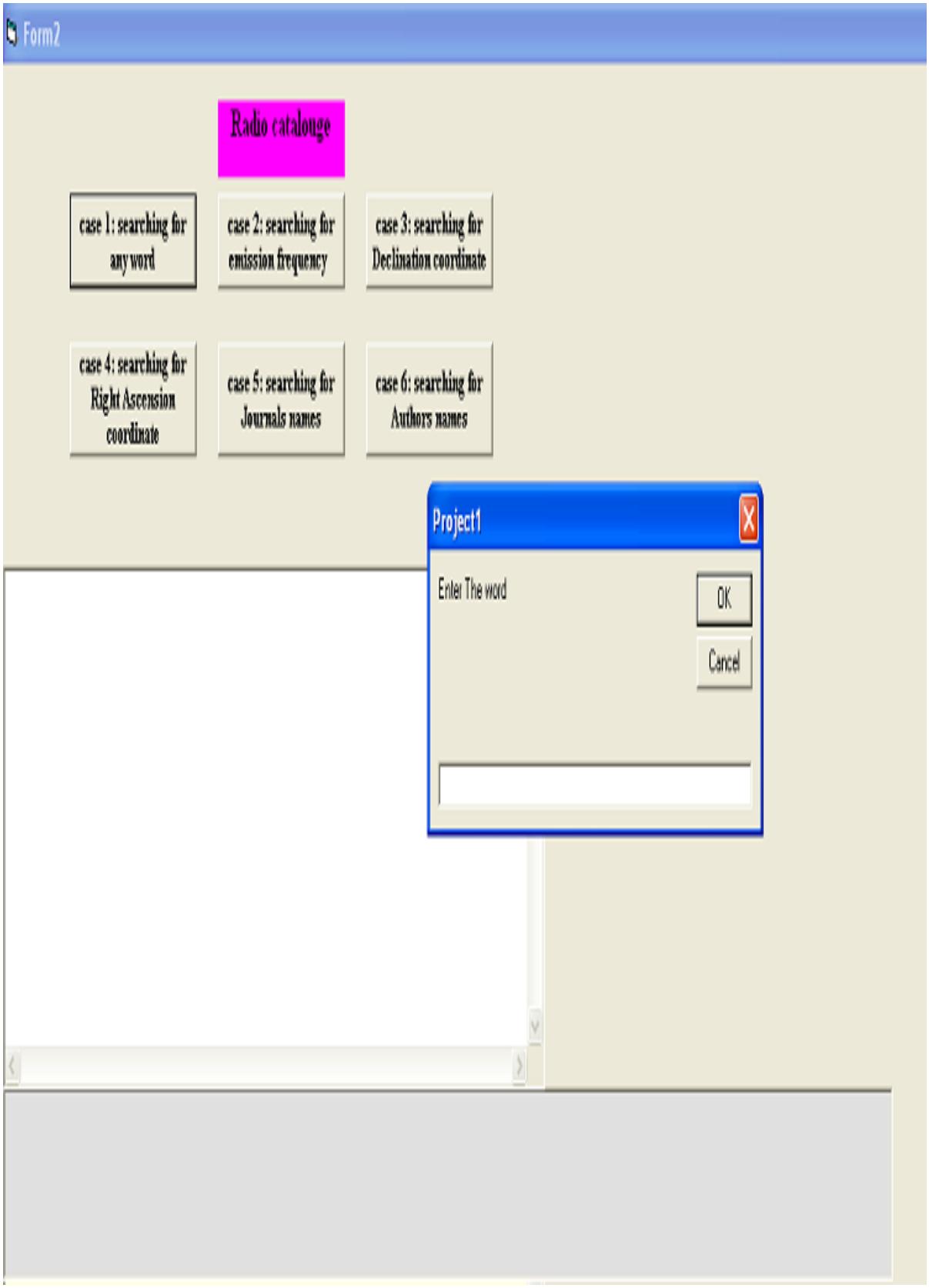
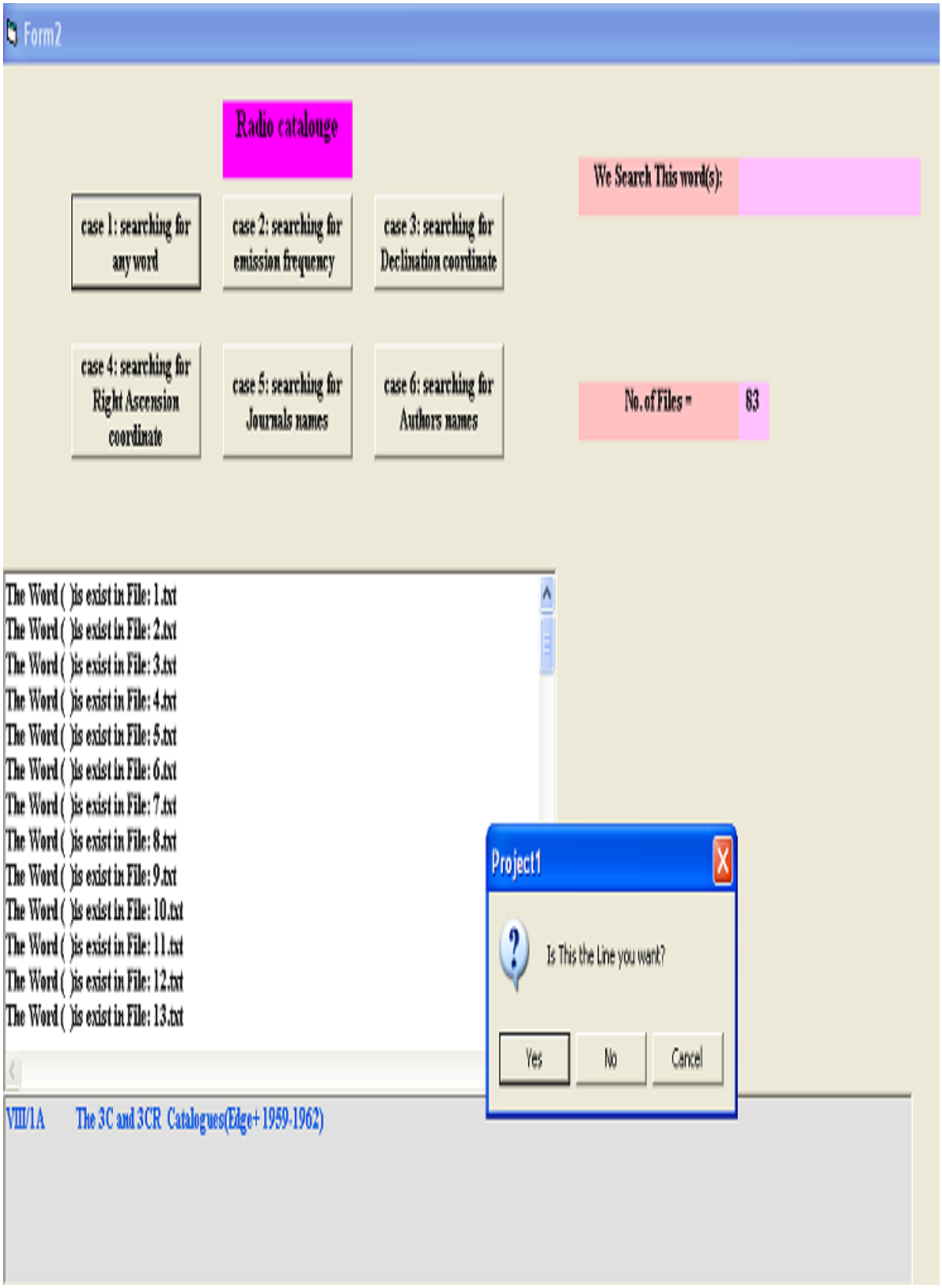


Figure 3: program window when we press on radio catalogue (VIII) command.

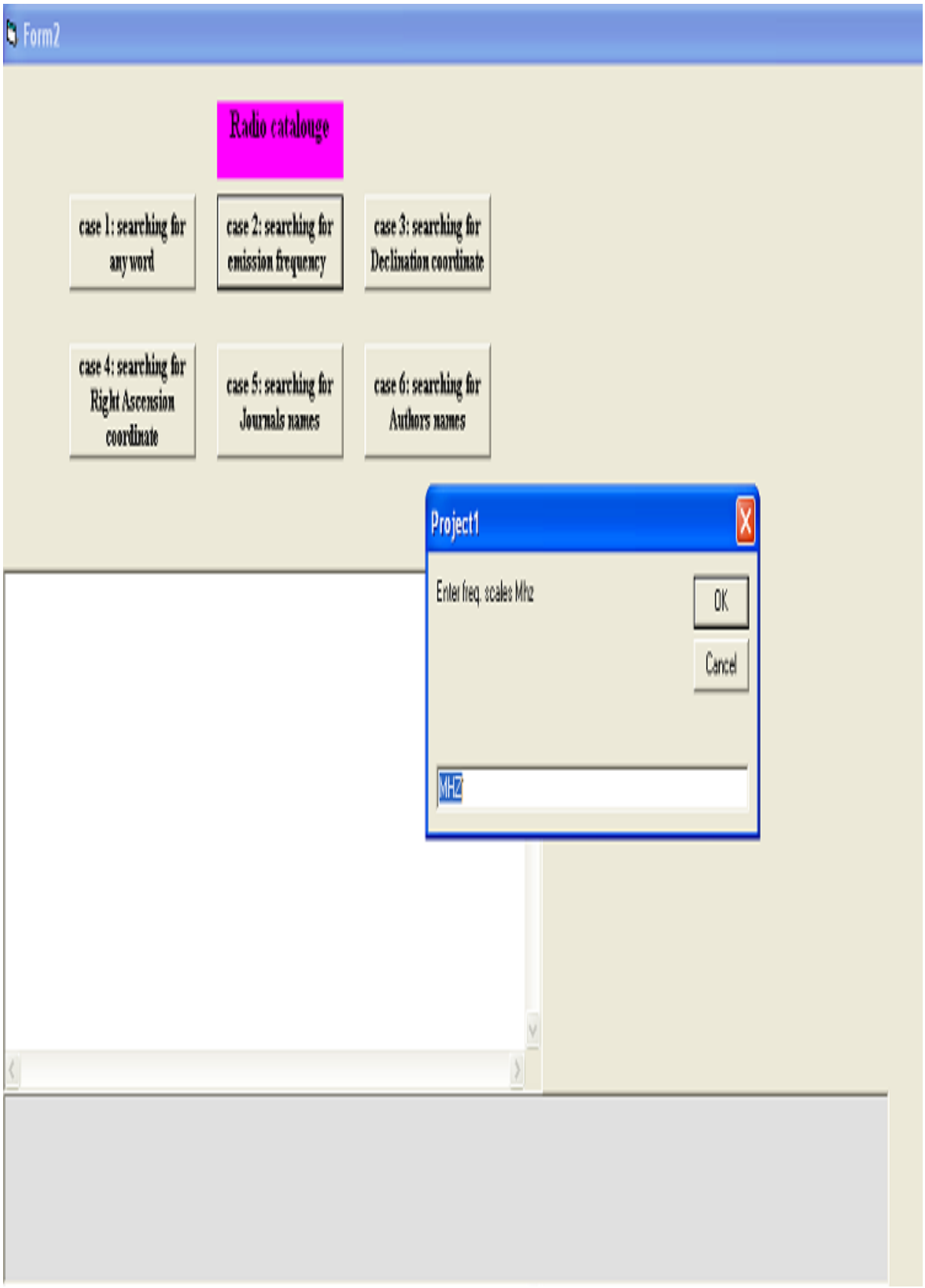

Form2
Radio catalouge
case 1: searching for any word
case 2: searching for emission frequency
case 3: searching for Declination coordinate
case 4: searching for Right Ascension coordinate
case 5: searching for Journals names
case 6: searching for Authors names
Project1
Enter The word
OK
Cancel

(a)

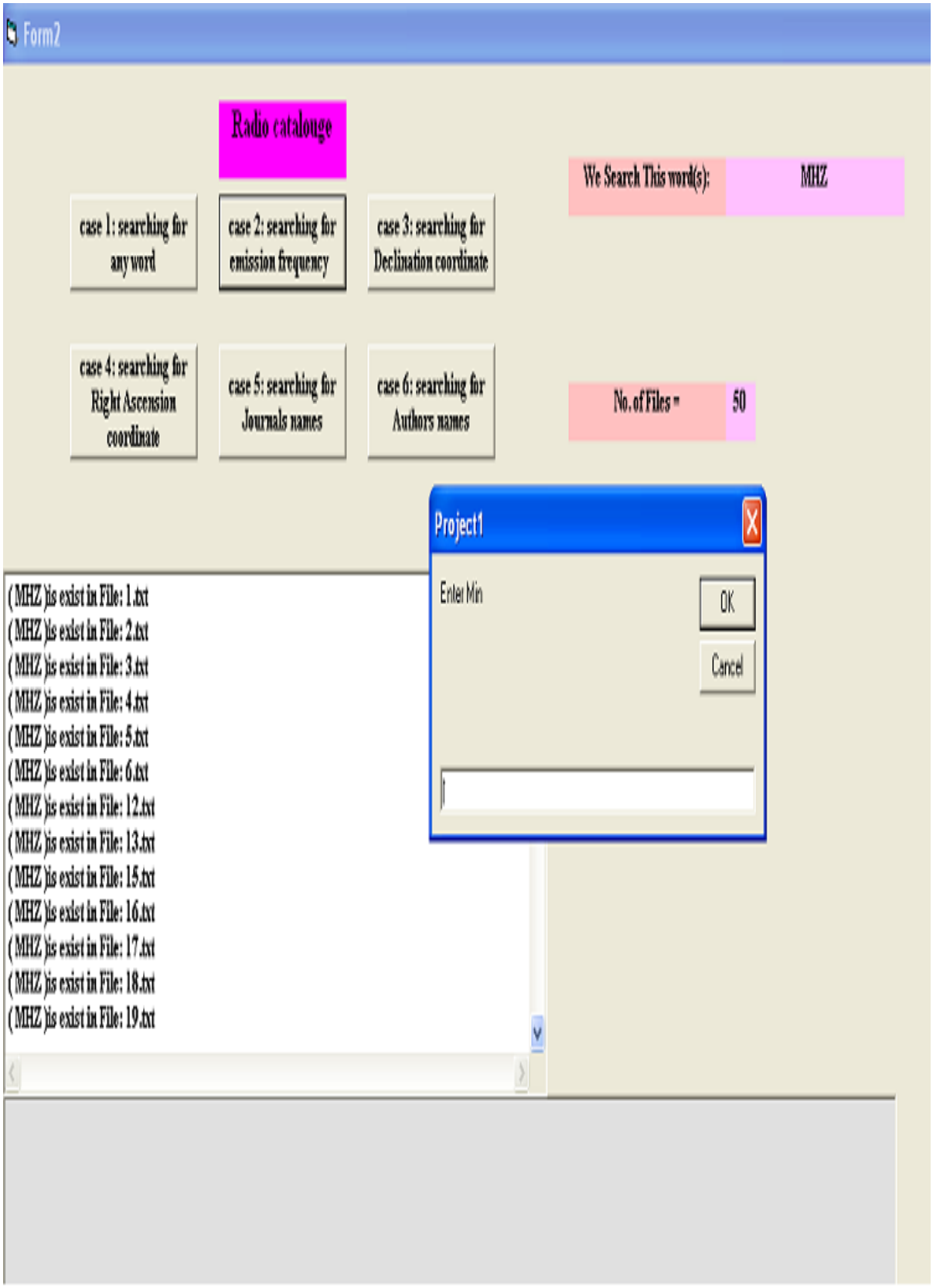


(b)

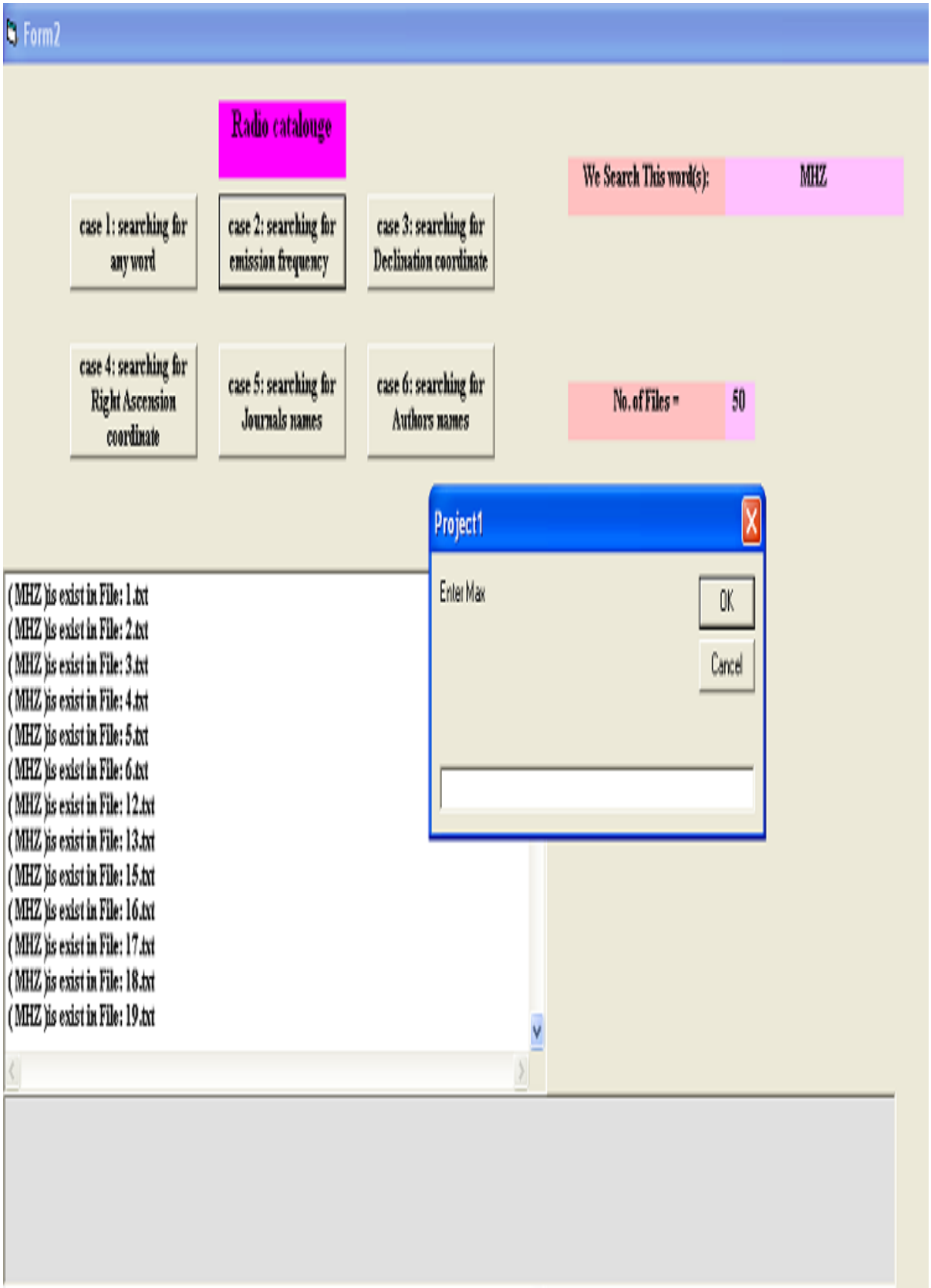
Figure 4: case 1: (a) when we press on case 1 command, (b) When we press ok on previous window.


Form2
Radio catalouge
case 1: searching for any word
case 2: searching for emission frequency
case 3: searching for Declination coordinate
case 4: searching for Right Ascension coordinate
case 5: searching for Journals names
case 6: searching for Authors names
Project1
Enter freq. scales Mhz
OK
Cancel
MHZ

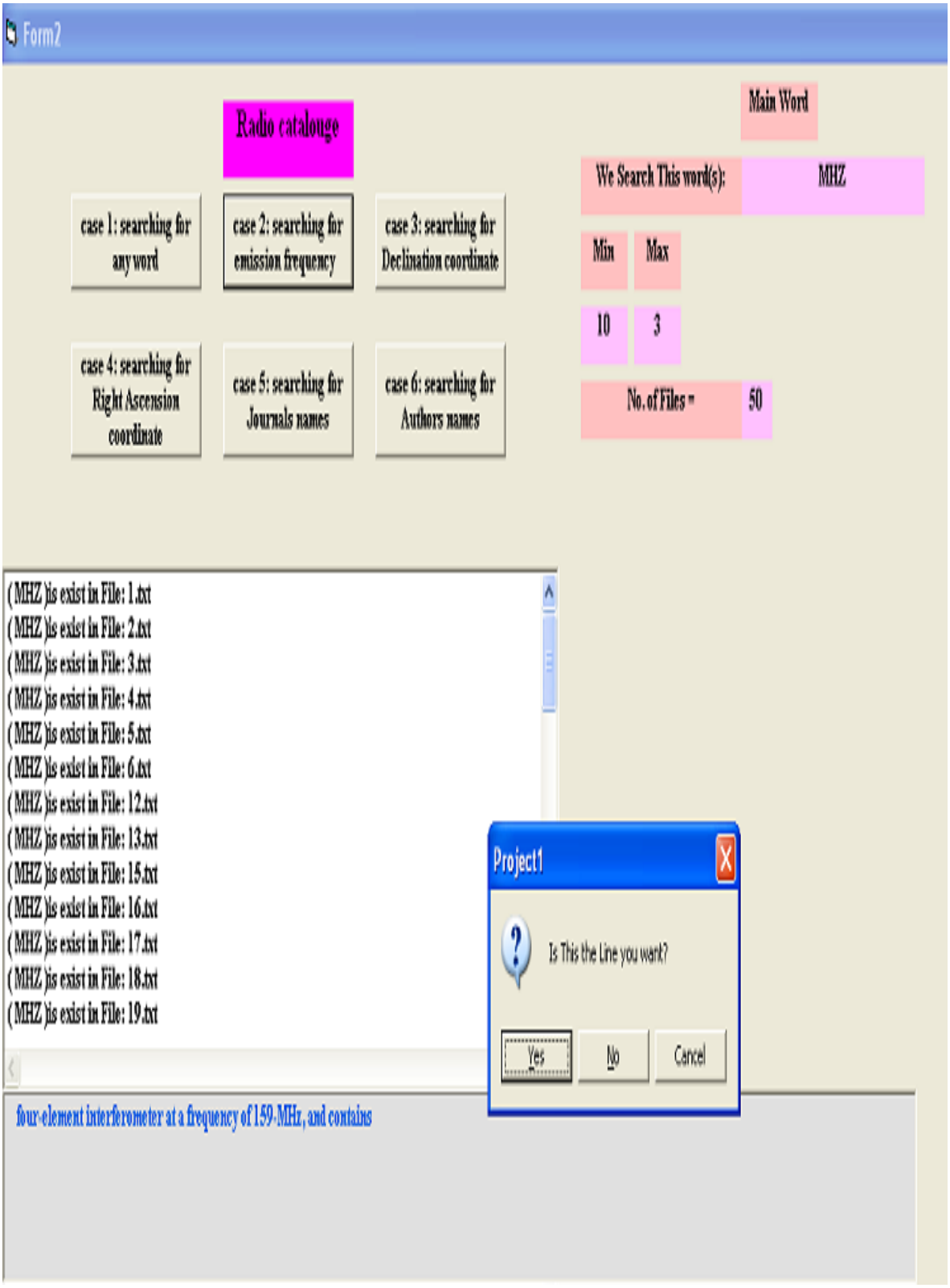
(a)


Form2
Radio catalouge
We Search This word(s):
MHZ
case 1: searching for any word
case 2: searching for emission frequency
case 3: searching for Declination coordinate
case 4: searching for Right Ascension coordinate
case 5: searching for Journals names
case 6: searching for Authors names
No. of Files =
50
Project1
Enter Min
OK
Cancel
(MHZ)is exist in File: 1.txt
(MHZ)is exist in File: 2.txt
(MHZ)is exist in File: 3.txt
(MHZ)is exist in File: 4.txt
(MHZ)is exist in File: 5.txt
(MHZ)is exist in File: 6.txt
(MHZ)is exist in File: 12.txt
(MHZ)is exist in File: 13.txt
(MHZ)is exist in File: 15.txt
(MHZ)is exist in File: 16.txt
(MHZ)is exist in File: 17.txt
(MHZ)is exist in File: 18.txt
(MHZ)is exist in File: 19.txt

(b)

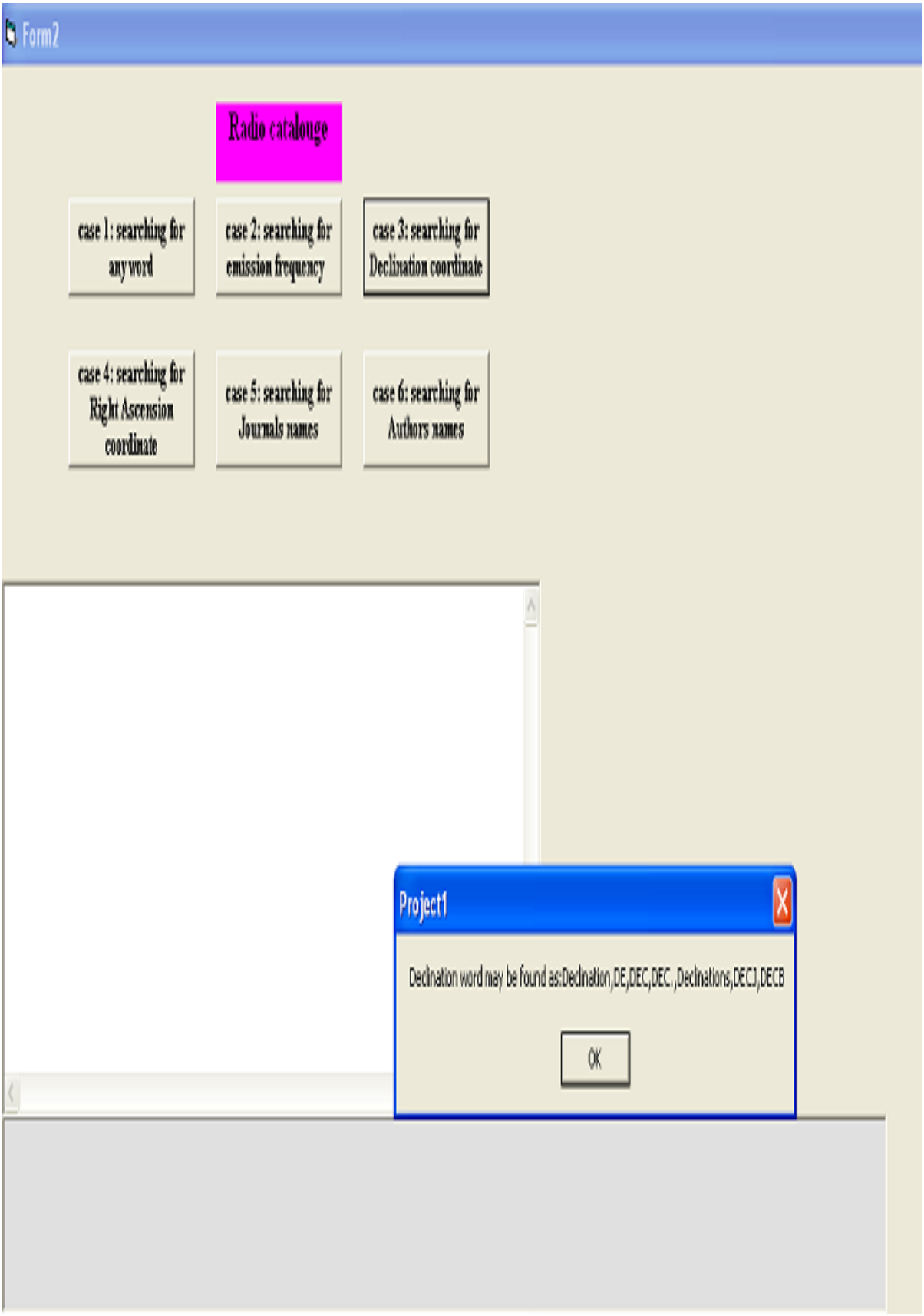

Form2
Radio catalouge
We Search This word(s):
MHZ
case 1: searching for any word
case 2: searching for emission frequency
case 3: searching for Declination coordinate
case 4: searching for Right Ascension coordinate
case 5: searching for Journals names
case 6: searching for Authors names
No. of Files =
50
Project1
Enter Max
OK
Cancel
(MHZ)is exist in File: 1.txt
(MHZ)is exist in File: 2.txt
(MHZ)is exist in File: 3.txt
(MHZ)is exist in File: 4.txt
(MHZ)is exist in File: 5.txt
(MHZ)is exist in File: 6.txt
(MHZ)is exist in File: 12.txt
(MHZ)is exist in File: 13.txt
(MHZ)is exist in File: 15.txt
(MHZ)is exist in File: 16.txt
(MHZ)is exist in File: 17.txt
(MHZ)is exist in File: 18.txt
(MHZ)is exist in File: 19.txt

(c)

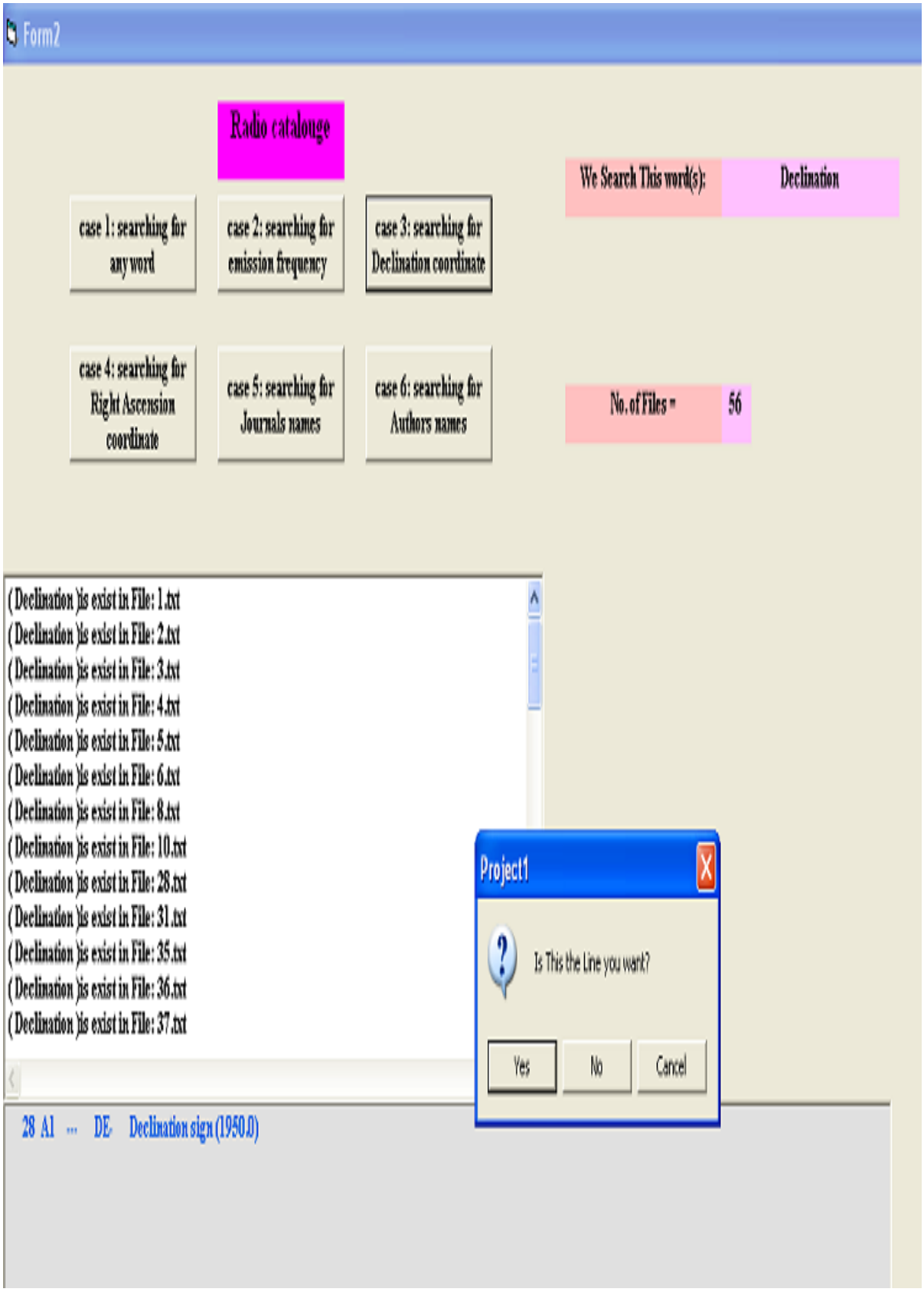


(d)

Figure 5: case 2: (a) When we press on case 2 command, (b) when we press ok on previous window , (c) When we press ok on previous window, (d) when we press ok on previous window.

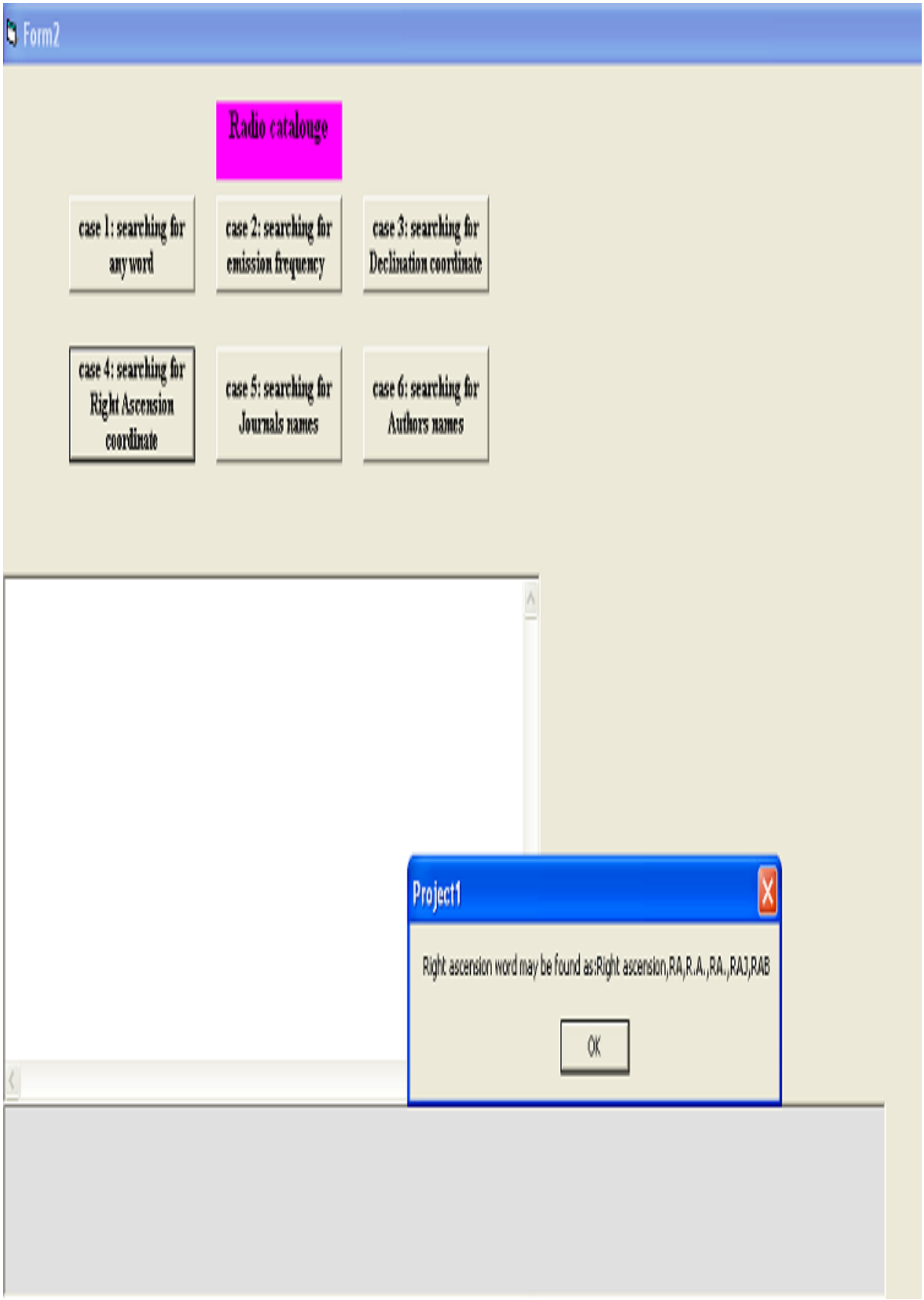

Form2
Radio catalouge
case 1: searching for any word
case 2: searching for emission frequency
case 3: searching for Declination coordinate
case 4: searching for Right Ascension coordinate
case 5: searching for Journals names
case 6: searching for Authors names
Project1
Declination word may be found as:Declination,DE,DEC,DEC.,Declinations,DECJ,DECB
OK

(a)

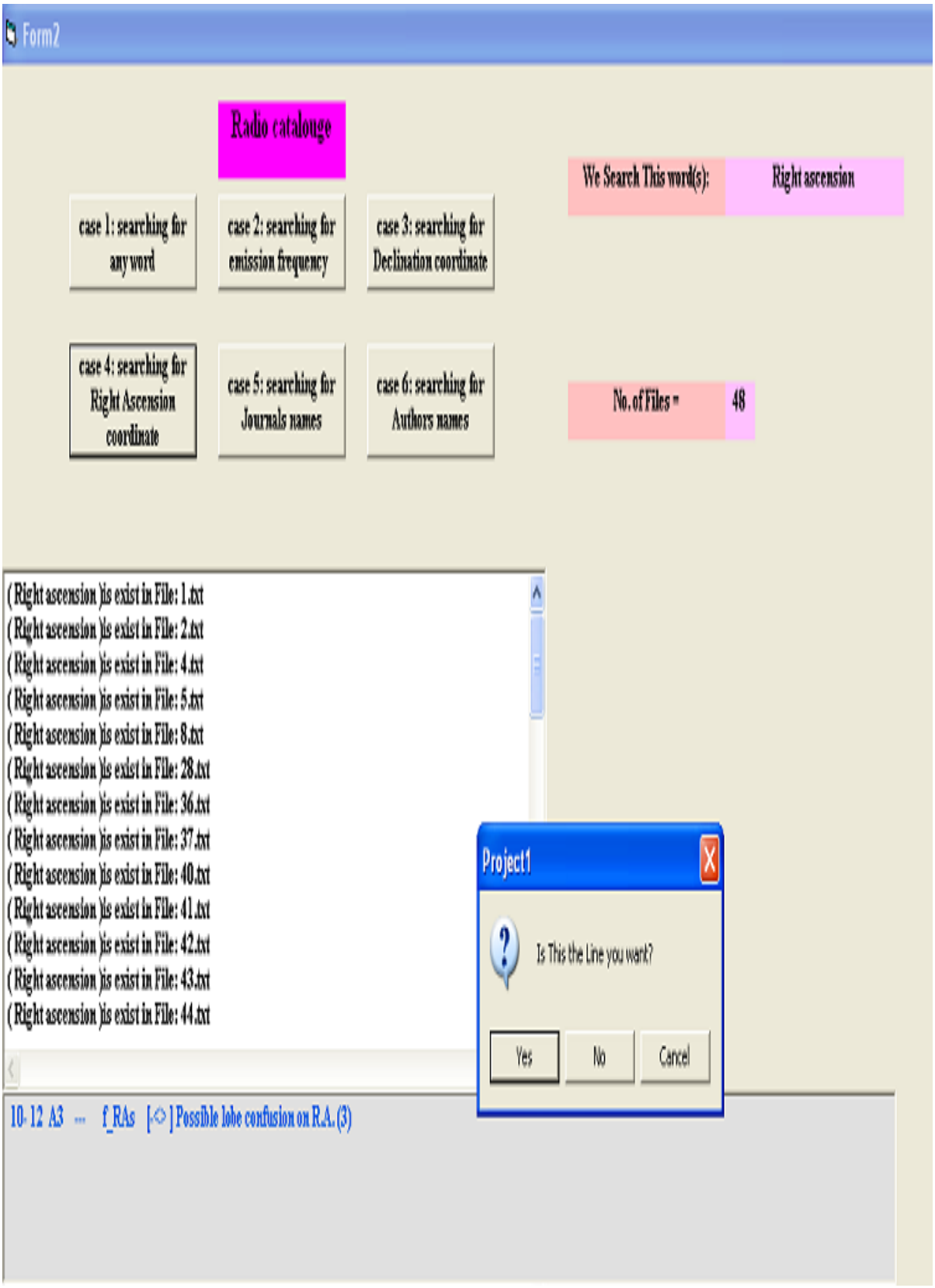


(b)

Figure 6: case 3: (a) When we press case 3 command, (b) When we press ok on previous window.

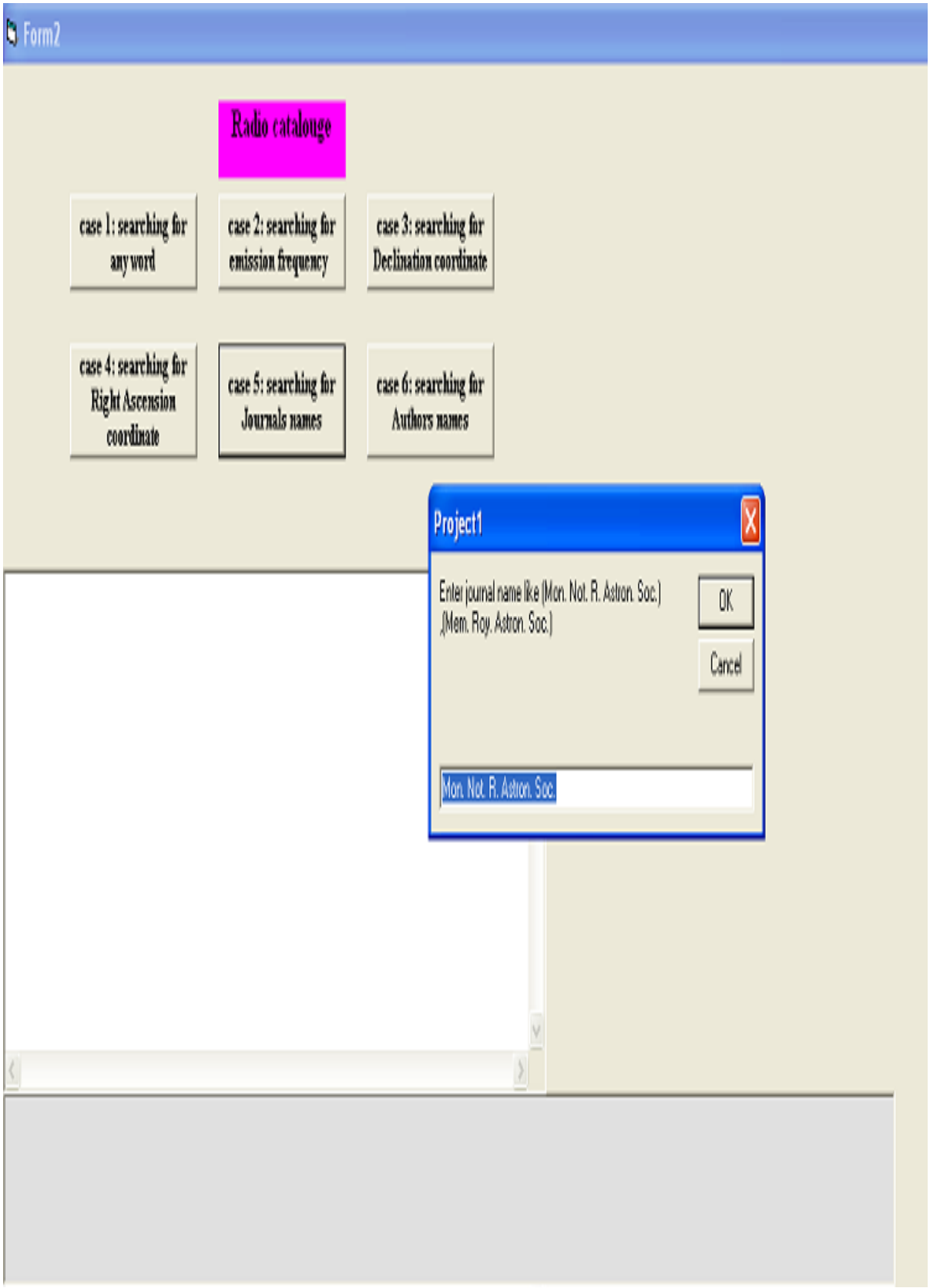

Form2
Radio catalouge
case 1: searching for any word
case 2: searching for emission frequency
case 3: searching for Declination coordinate
case 4: searching for Right Ascension coordinate
case 5: searching for Journals names
case 6: searching for Authors names
Project1
Right ascension word may be found as:Right ascension,RA,R.A.,RA.,RAJ,RAB
OK

(a)

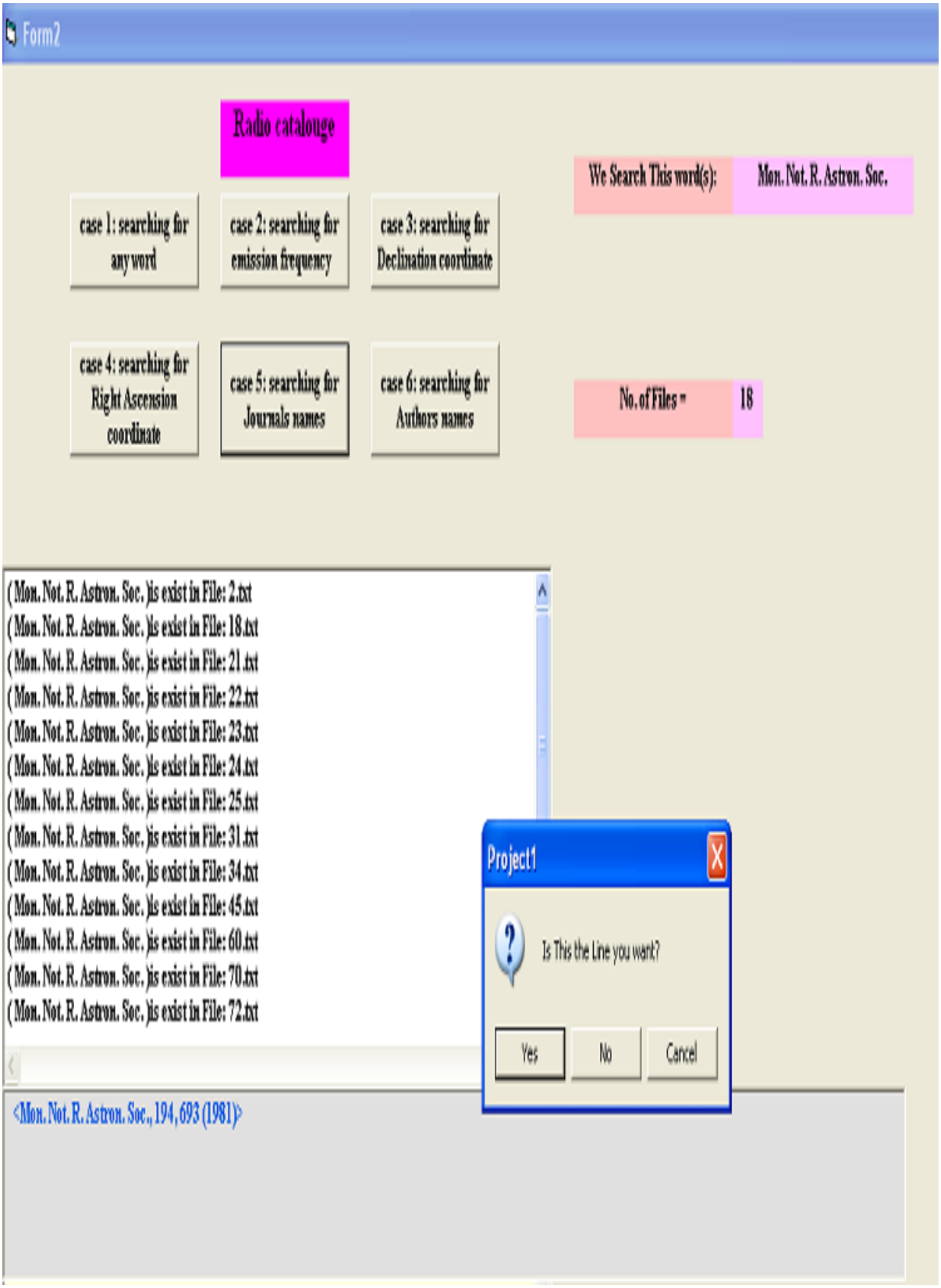


(b)

Figure 7: case 4: (a) When we press on case 4 command, (b) When we press ok on previous window.

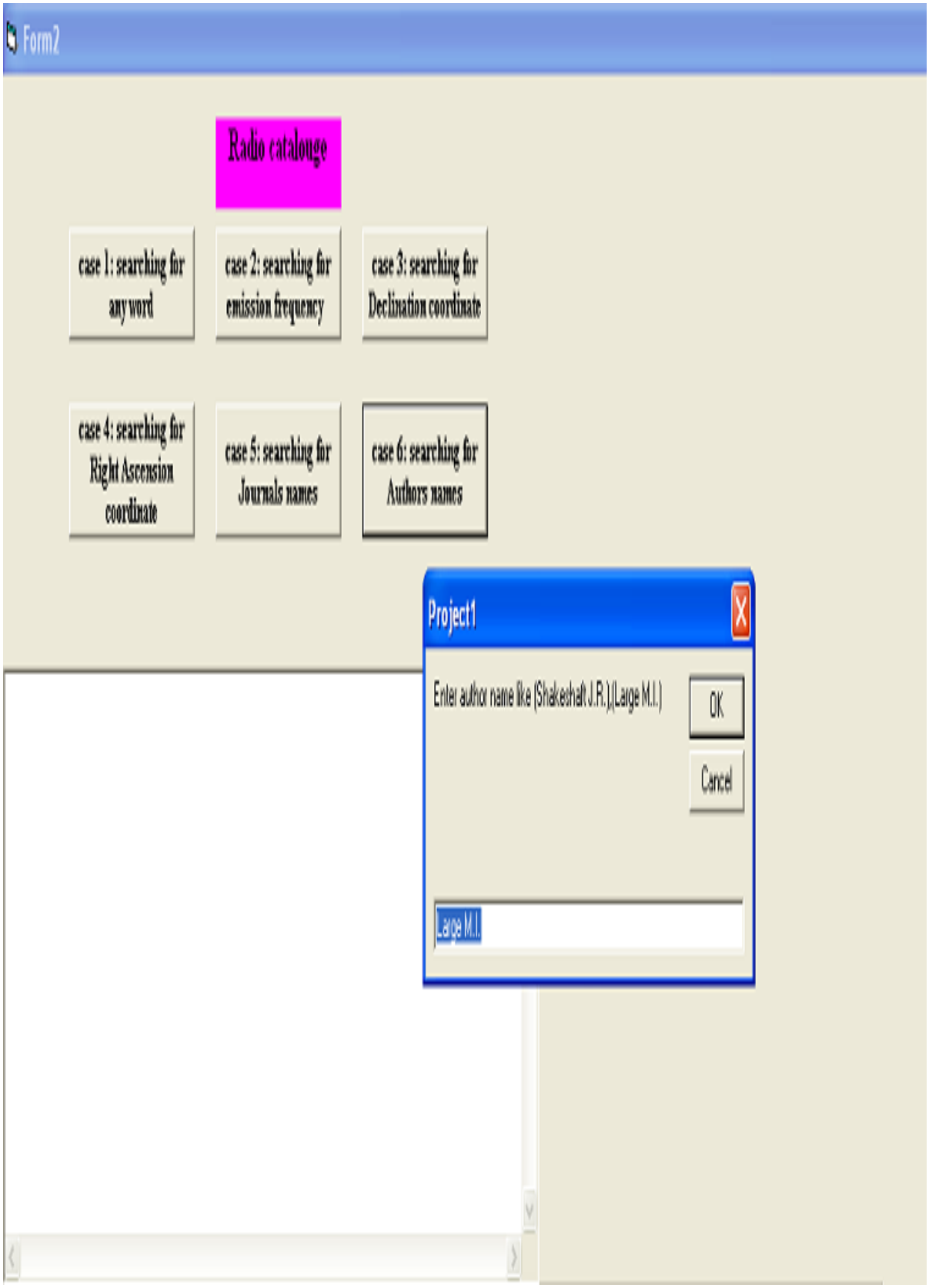

Form2
Radio catalouge
case 1: searching for any word
case 2: searching for emission frequency
case 3: searching for Declination coordinate
case 4: searching for Right Ascension coordinate
case 5: searching for Journals names
case 6: searching for Authors names
Project1
Enter journal name like (Mon. Not. R. Astron. Soc.) (Mem. Roy. Astron. Soc.)
OK
Cancel
Mon. Not. R. Astron. Soc.

(a)

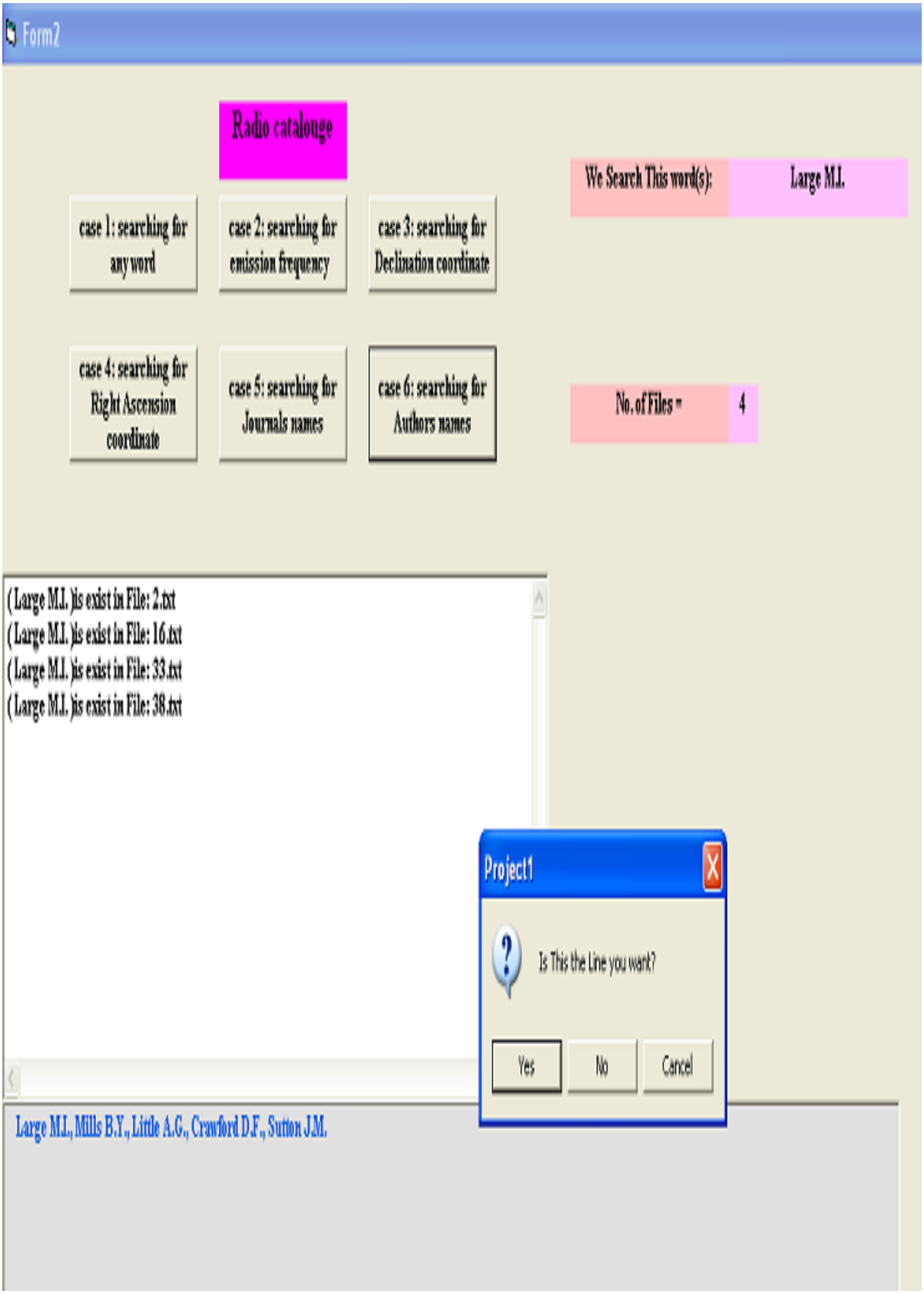


(b)

Figure 8: case 5: (a) When we press on case 5 command, (b) When we press ok on previous window.


Form2
Radio catalouge
case 1: searching for any word
case 2: searching for emission frequency
case 3: searching for Declination coordinate
case 4: searching for Right Ascension coordinate
case 5: searching for Journals names
case 6: searching for Authors names
Project1
Enter author name like (Shakeshaft J.R.)(Large M.I.)
OK
Cancel
Large M.I.

(a)



(b)

Figure 9: case 6: (a) when we press on case 6 command, (b) When we press ok on previous window.

Description for The program cases algorithm

Case 1(word searching): in this case (figure (4)) the program makes searching through catalogue files about any entry word (for any length character) for example the file in figure (10), the user can be enter any word such (H I 21-cm) , the program will be search in all files about this word.

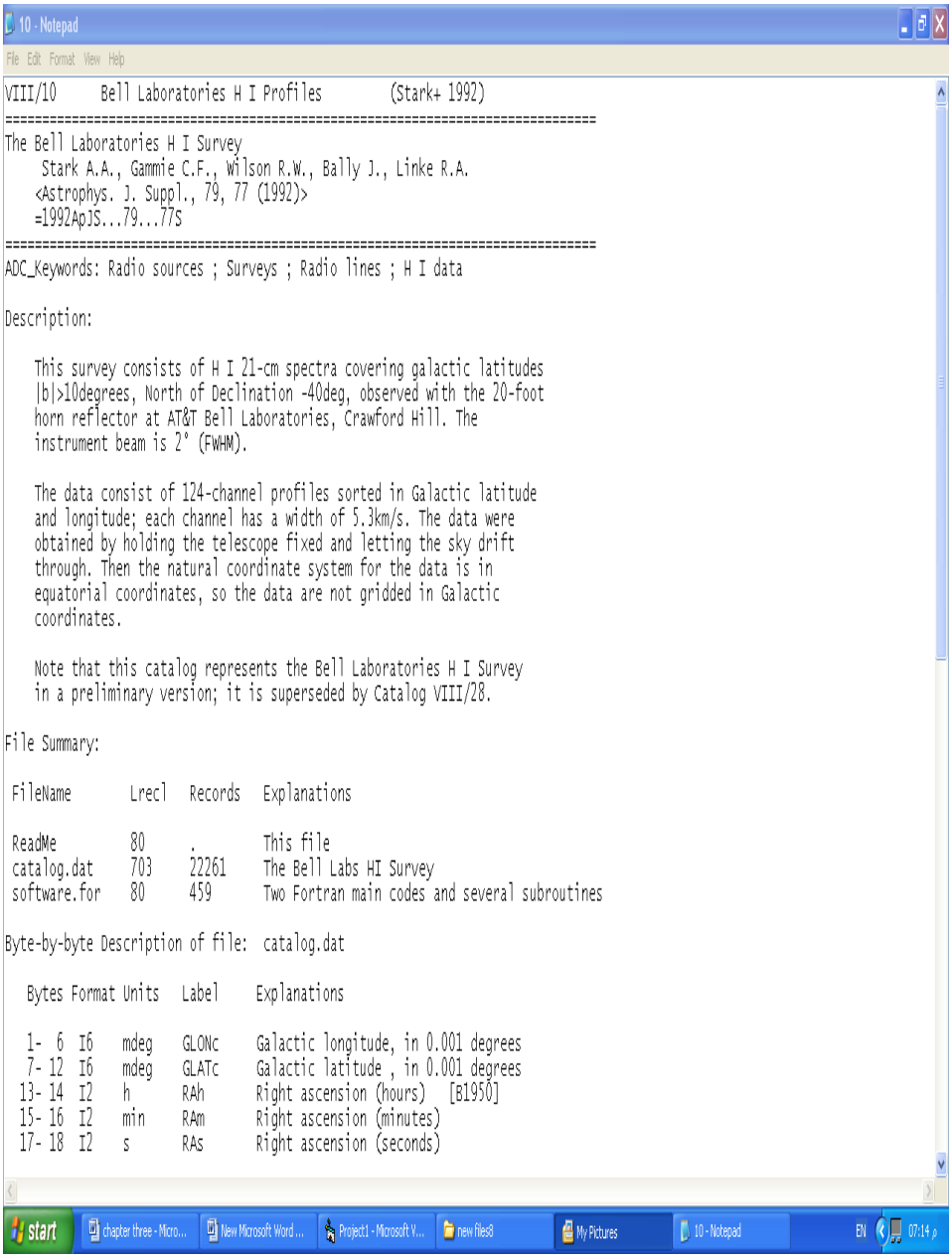


Figure 10: some information from part of file in CDS catalogues [5].

Case 2 (frequency emission searching)(figure (5)): These frequencies are to important to us to determine the energy and wavelength for the radio emission sources (figure (11) some frequencies), in this case the searching for the frequencies according to its unit such as (MHZ) and the program can also searching for KHZ, GHZ,…etc.

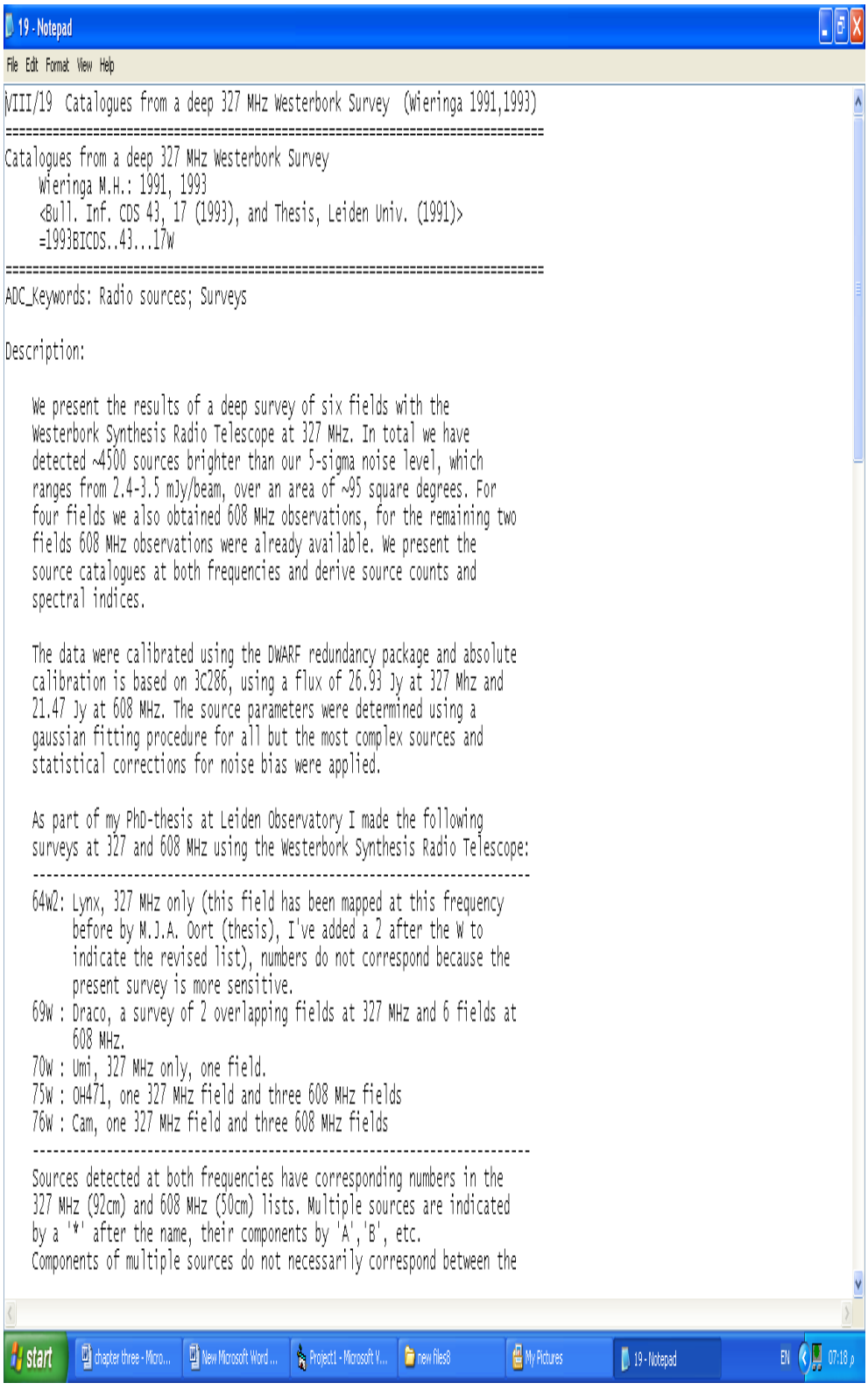


Figure 11: a part of file contains some frequencies [6].

Case 3 (declination searching): in this case (figure (6)) a searching for declination of any radio objects. After we studied our files we found the declination word is written in different \ways such as: declination, DE, DEC, DEC., DECJ, DECB and declinations, all these options are studied. Figure (12) shows declination written in different way.

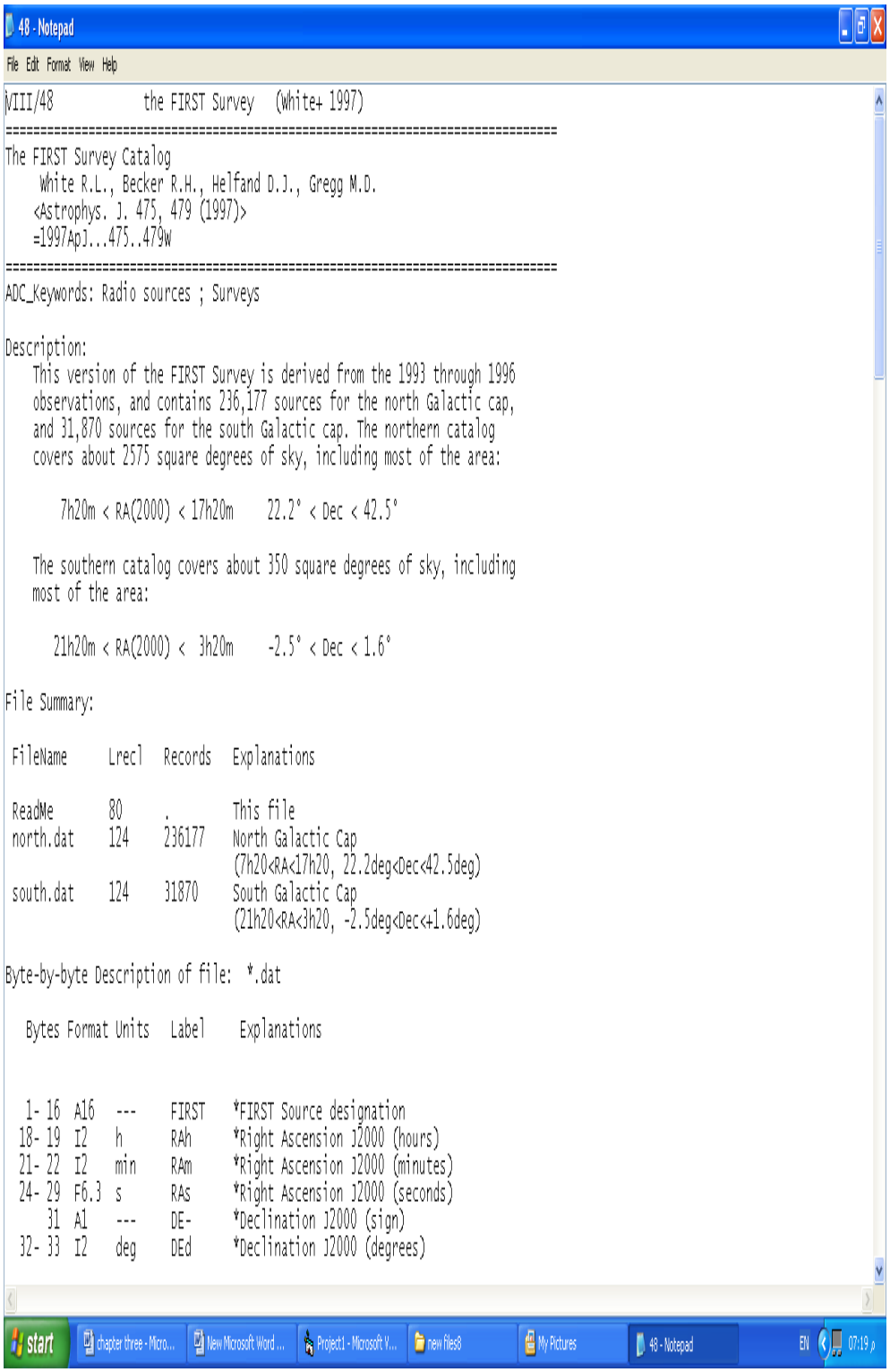


Figure 12: a part file from CDS catalogues has declination written in different way [7].

Case 4 (right ascension searching): In this case (figure (7)) of the program we are searching for right ascension words. We open and read all files we have to known what the words we want in this search, after we read these files we found right ascension word is written in many kinds like: RA, R.A., RAJ, RAB, RA., and right ascension, so in this case we search for these words. See figure (13) some abbreviations for right ascension.

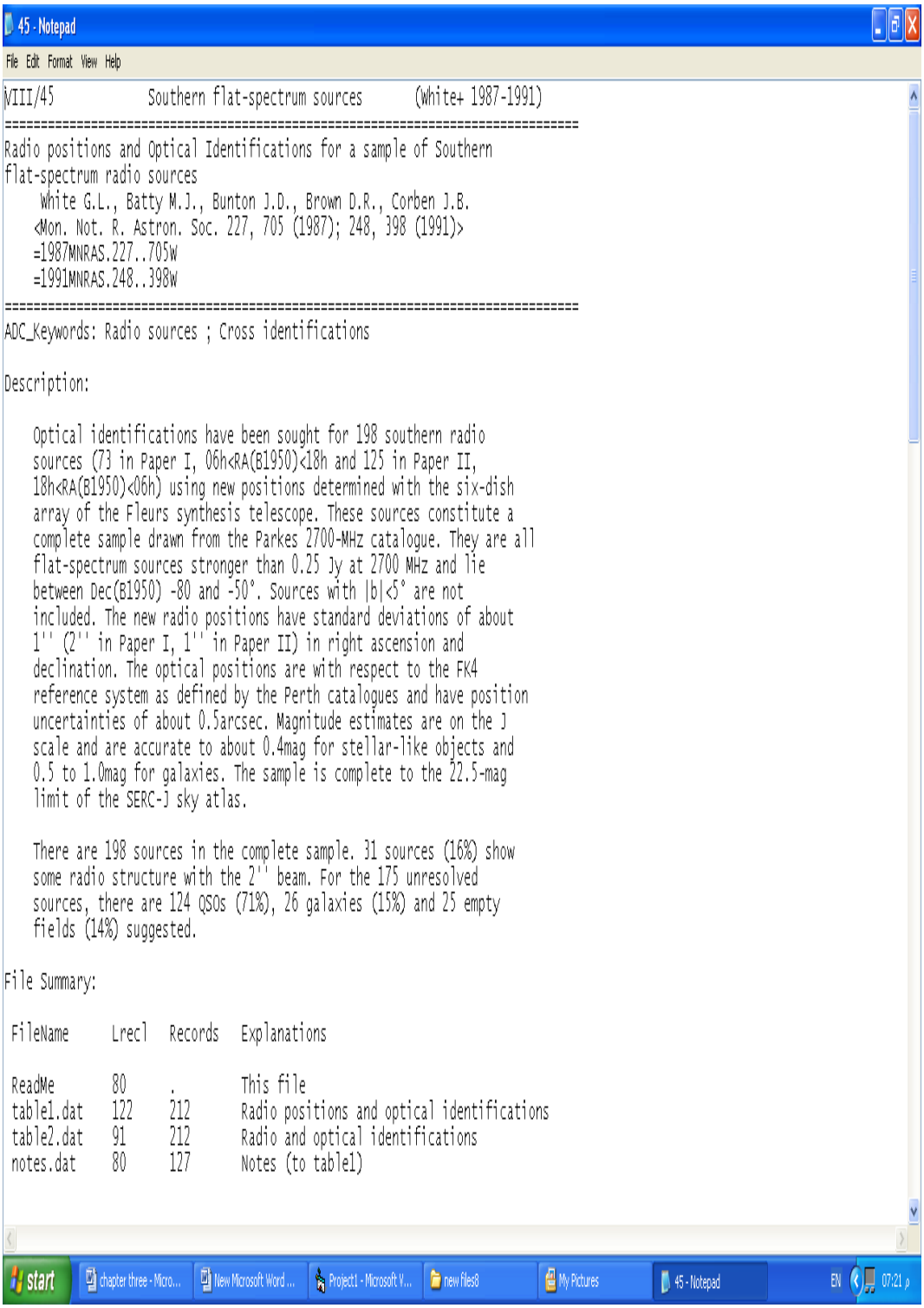


Figure 13: some right ascension abbreviations from part of file in CDS catalogues [8].

Case 5 (journals searching): In this case (figure (8)) we are searching for publication journals names like (Mon. Not. R. Astron. Soc.), see figure (14) another journal name from this catalogues.

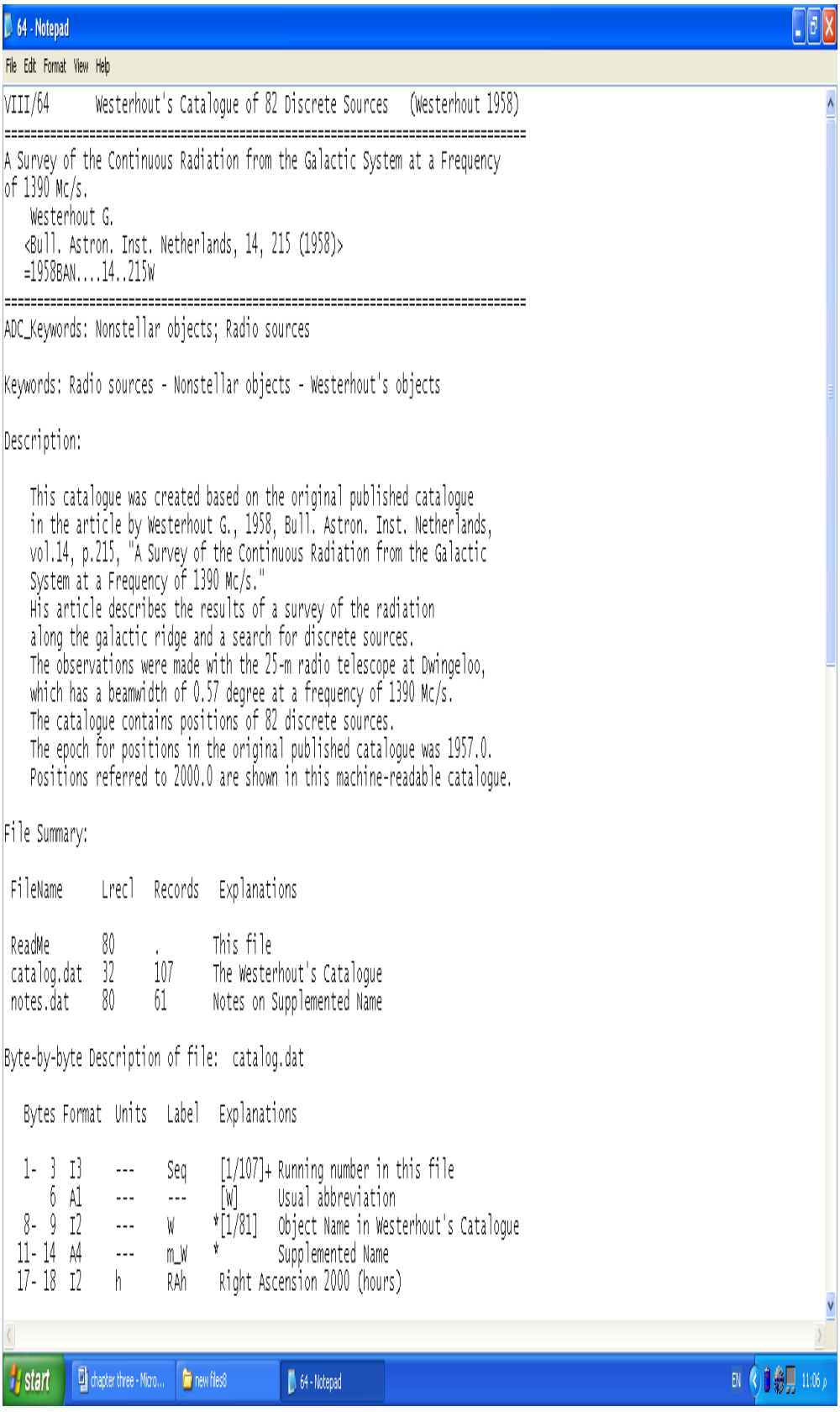


Figure 14 :name of publication journal from a part of file in CDS catalogues [9].

Case 6 (authors searching): This case (figure (9)) is searching for authors names like (Large M.I.), figure (15) shows many other authors names.

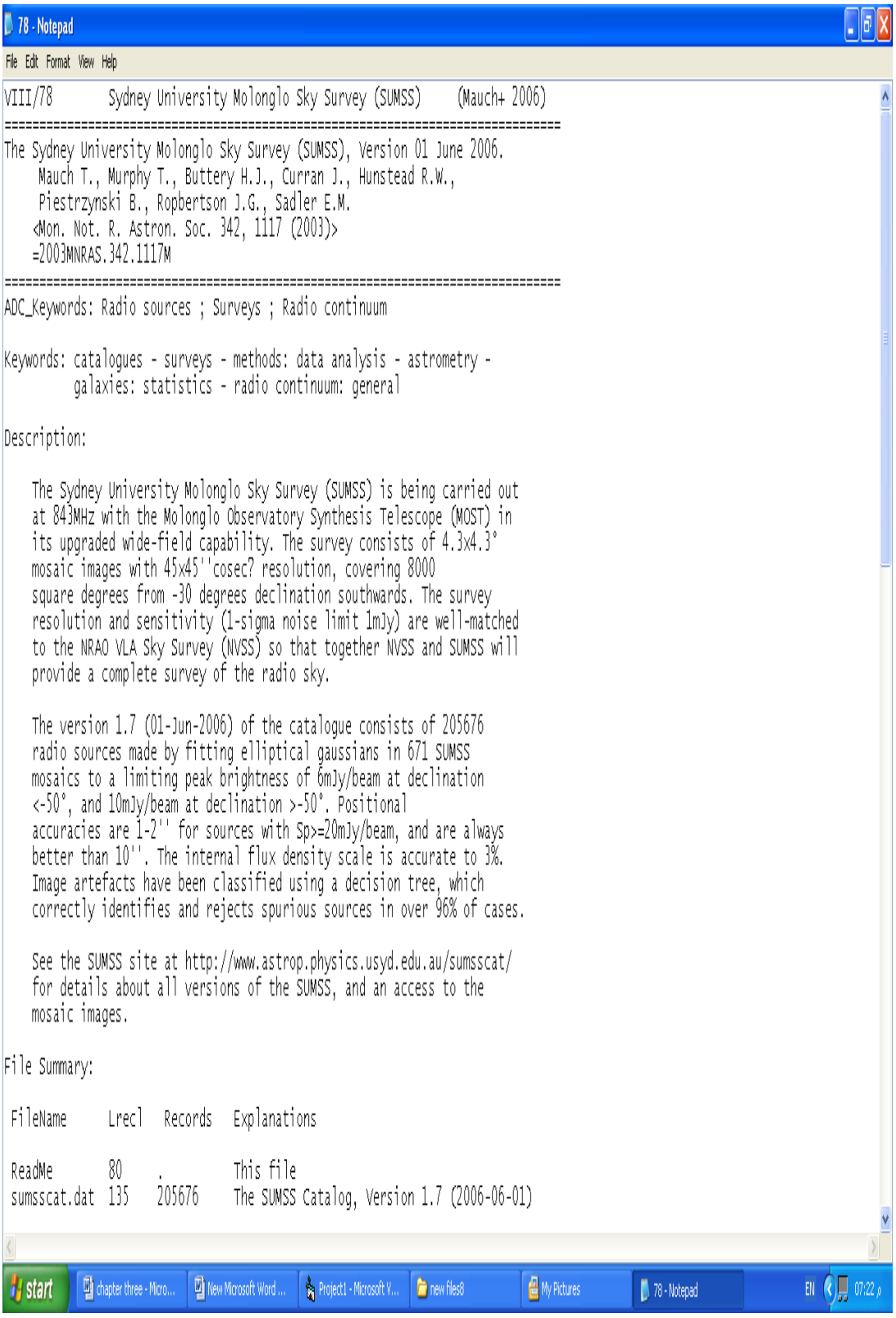
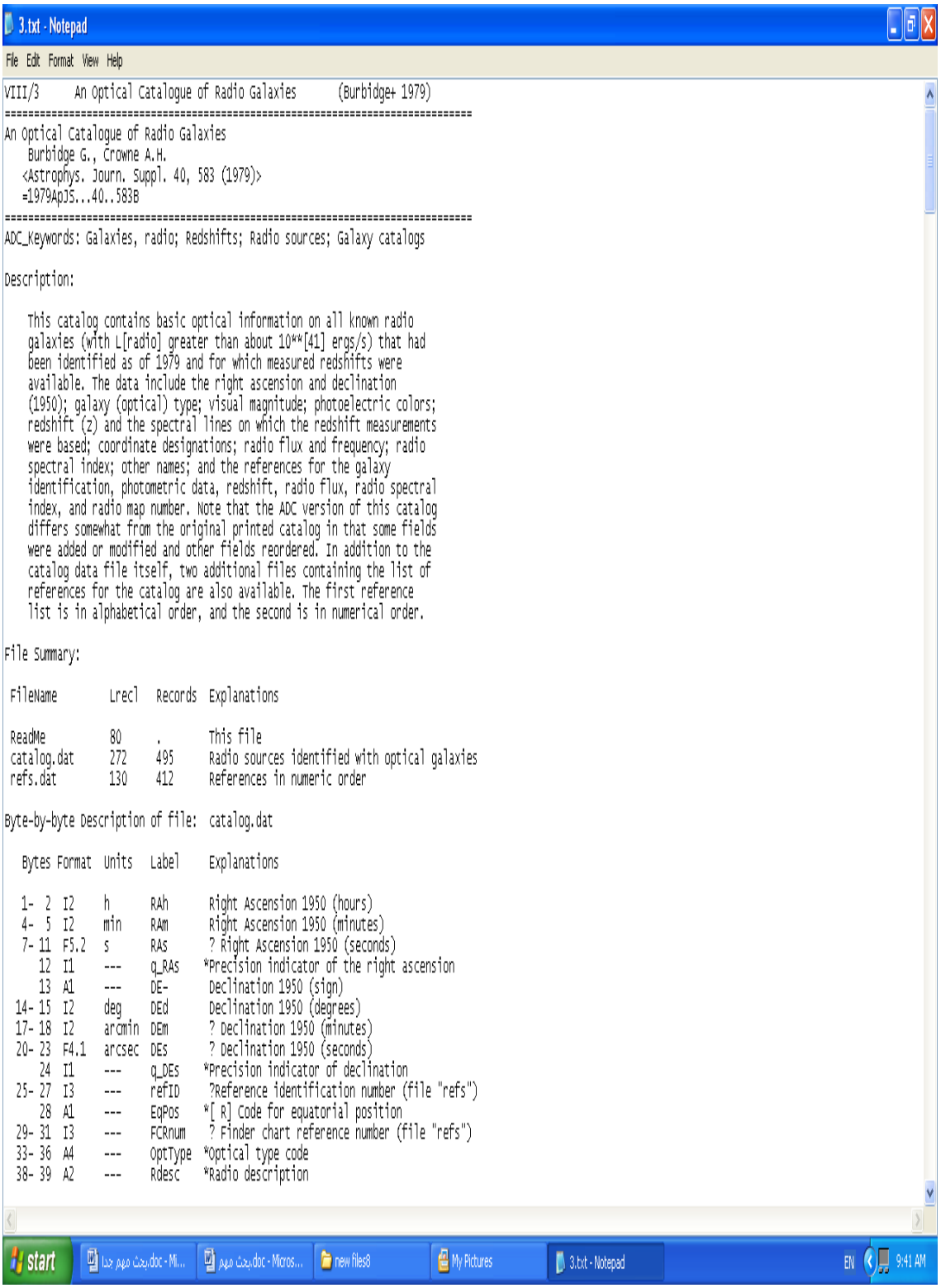


Figure 15: many authors names from a part of file in CDS catalogues [10].

Results and conclusions

The program was tested on the 85 files (text files); the results can be explained in following:

_ Most of these files talk about group of objects like galaxies cluster or radio galaxies cluster…etc, as shown in figures (16) and (17).



3.txt - Notepad

File Edit Format View Help

```
VIII/3      An Optical Catalogue of Radio Galaxies       (Burbidge+ 1979)
================================================================================
An Optical Catalogue of Radio Galaxies
    Burbidge G., Crowne A.H.
   <Astrophys. Journ. Suppl. 40, 583 (1979)>
   =1979ApJS...40..583B
================================================================================
ADC_Keywords: Galaxies, radio; Redshifts; Radio sources; Galaxy catalogs

Description:

    This catalog contains basic optical information on all known radio
    galaxies (with L[radio] greater than about 10**[41] ergs/s) that had
    been identified as of 1979 and for which measured redshifts were
    available. The data include the right ascension and declination
    (1950); galaxy (optical) type; visual magnitude; photoelectric colors;
    redshift (z) and the spectral lines on which the redshift measurements
    were based; coordinate designations; radio flux and frequency; radio
    spectral index; other names; and the references for the galaxy
    identification, photometric data, redshift, radio flux, radio spectral
    index, and radio map number. Note that the ADC version of this catalog
    differs somewhat from the original printed catalog in that some fields
    were added or modified and other fields reordered. In addition to the
    catalog data file itself, two additional files containing the list of
    references for the catalog are also available. The first reference
    list is in alphabetical order, and the second is in numerical order.

File Summary:

 FileName       Lrecl   Records  Explanations

 ReadMe         80      .        This file
 catalog.dat    272     495      Radio sources identified with optical galaxies
 refs.dat       130     412      References in numeric order

Byte-by-byte Description of file:  catalog.dat

   Bytes Format  Units   Label    Explanations

   1- 2  I2      h       RAh      Right Ascension 1950 (hours)
   4- 5  I2      min     RAm      Right Ascension 1950 (minutes)
   7- 11 F5.2    s       RAs      ? Right Ascension 1950 (seconds)
     12  I1      ---     q_RAs   *Precision indicator of the right ascension
     13  A1      ---     DE-      Declination 1950 (sign)
  14- 15 I2      deg     DEd      Declination 1950 (degrees)
  17- 18 I2      arcmin  DEm      ? Declination 1950 (minutes)
  20- 23 F4.1    arcsec  DEs      ? Declination 1950 (seconds)
     24  I1      ---     q_DEs   *Precision indicator of declination
  25- 27 I3      ---     refID    ?Reference identification number (file "refs")
     28  A1      ---     EqPos   *[ R] Code for equatorial position
  29- 31 I3      ---     FCRnum   ? Finder chart reference number (file "refs")
  33- 36 A4      ---     OptType  *Optical type code
  38- 39 A2      ---     Rdesc    *Radio description
```

start | new files8 | My Pictures | 3.txt - Notepad | EN | 9:41 AM

Figure 16: a file from CDS catalogue [11].

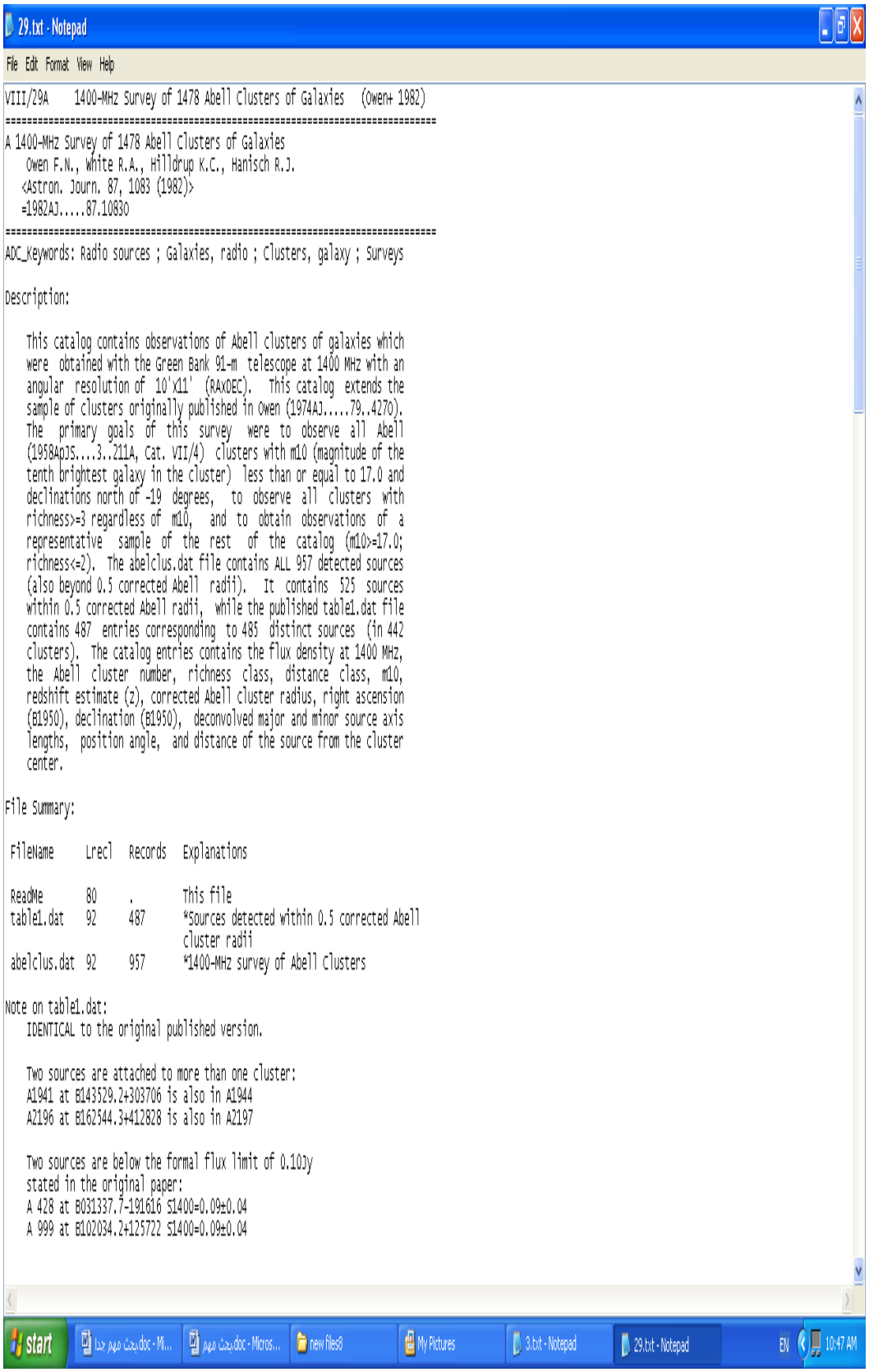


Figure 17: another file from CDS catalogue [12].

When the program was tested on radio sources emission frequency band, the results of searching were:-

1. 8 files have frequency between 1000 – 2000 MHZ.
2. 6 files have frequency between 2000 – 3000 MHZ.
3. 1 file has frequency between 3000 – 4000 MHZ.
4. 6 files have frequency between 4000 – 5000 MHZ.
5. 3 files have frequency between 5000 – 6000 MHZ.
6. No files have frequency between 6000 – 7000 MHZ.
7. 2 files have frequency between 8000 – 9000 MHZ.
8. 7 files have frequency between 1 – 100 GHZ.
9. 2 files have frequency between 100 – 200 GHZ.
10. No files have frequency between 200 – 300 GHZ.
11. 1 file has frequency between 300 – 400 GHZ.

The program can be also searching for name of journal, and name of author. This program can be modified for searching any observation data in files for other catalogues which are including in table (1). The number of cases in each type of catalogues can be determined from the observation data analysis.

References

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