DS Practical-1

Q. Write a program containing the following set operation functions for a given set :-

a) Unique() **b) ismember**

c) Cardinality **c) powerset**

Code:-

```
//Harsh Bamotra   AC-1216
//Program to perform different functions on set

#include <iostream>
#include <math.h>
#include <array>
using namespace std;

class sets
  {
        private:                        //declaring private members
        int arr[100] , n;

        public:                                 //declaring public members
        void input()                            //input function to take user's input
                {
                        cout << "Enter the number of set elements ::";
                        cin >> n;
                        for(int i=0 ; i<n ; i++)
                                {
                                        cout << "Enter the elements at index " << i << " ::";
                                        cin >> arr[i];
                                }
                }
        void print()                                    //print funtion to print the set
                {
                        for(int i=0 ; i<n ; i++)
                                {
                                        cout << arr[i] << " ";
                                }
                }
        void unique()                   //unique function to remove duplicate elements from the set
                {
                        for(int i=0 ; i<n ; i++)
```

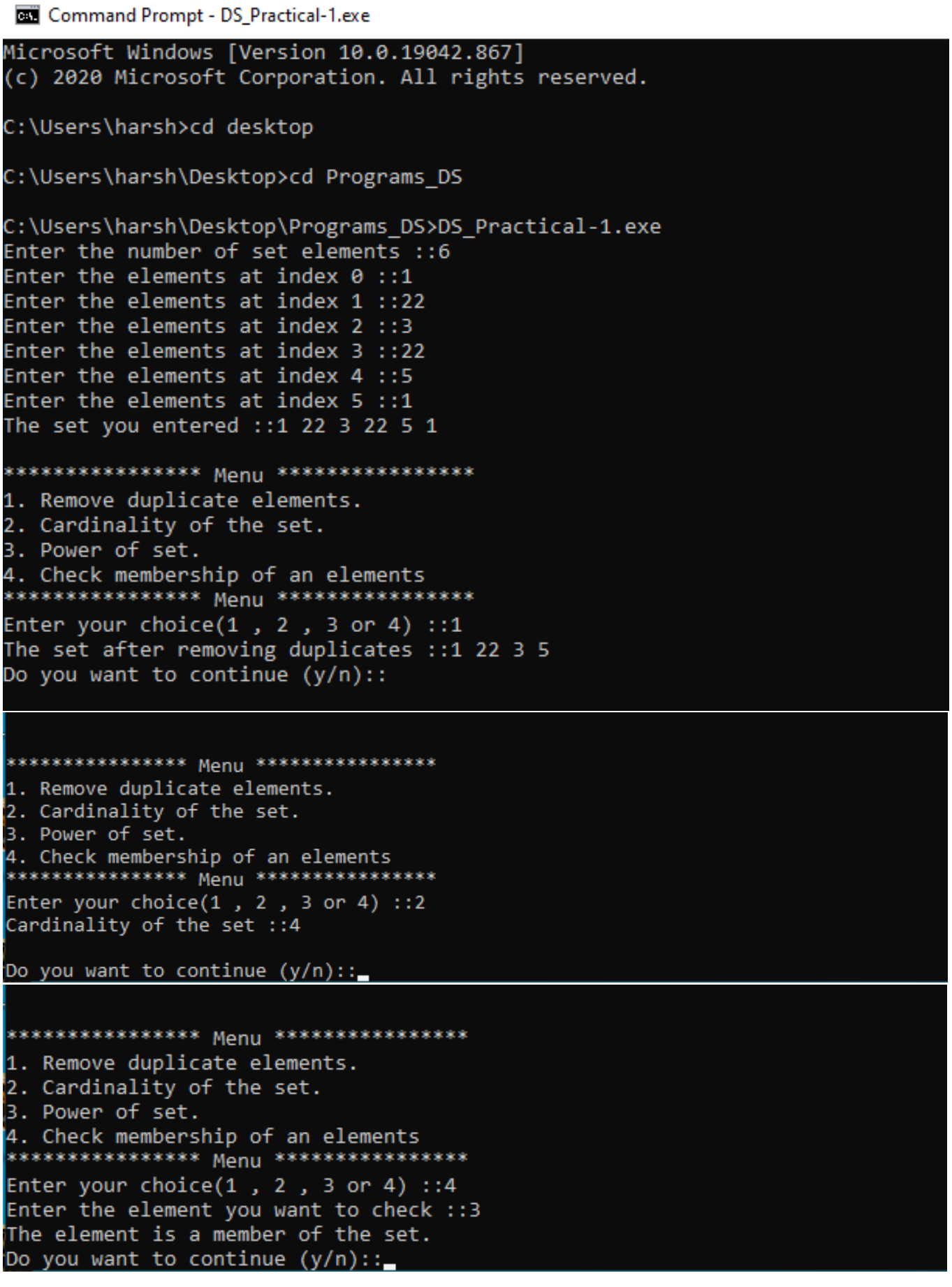
```
                for(int j=i+1 ; j<n ; j++)
                        {
                                if(arr[i]==arr[j])
                                        {
                                                for(int l=j ; l<n ; l++)
                                                        {
                                                                arr[l]=arr[l+1];
                                                        }
                                                n--;
                                        }
                        }
                }
        bool ismember(int x)                            //function to check membership of an element
                {
                        bool re=false;
                        for(int i=0 ; i<n ; i++)
                                if(arr[i]==x)
                                        re=true;
                        return re;
                }
        int cardi()                                             //function to find the cardinality
                {
                        size=n;
                        return size;
                }
        void powerset()                                         //funtion to print the power set
                {
                        cout << "The power of set ::" << endl;
                        int c=pow(2 , n);
                        for(int i=0 ; i<c ; i++)
                                {
                                        cout << "{ ";
                                        for(int j=0 ; j<n ; j++)
                                                {
                                                        if((i & (1<<j))!=0)
                                                                cout << arr[j] << " ";
                                                }
                                        cout << " }";
                                        cout << endl;

                                }
                }
   };

int main()
   {
        int ch;
        char y='y';
```

```
	sets obj;
	obj.input();                                                    //taking user's input
	cout << "The set you entered ::";
	obj.print();                                                     //printing the set
	while(y=='y' || y=='Y')                                         //printing the menu
		{
			cout << endl << endl << "**************** Menu ****************" << endl;
			cout << "1. Remove duplicate elements." << endl;
			cout << "2. Cardinality of the set." << endl;
			cout << "3. Power of set." << endl;
			cout << "4. Check membership of an elements" << endl;
			cout << "**************** Menu ****************" << endl;
			cout << "Enter your choice(1 , 2 , 3 or 4) ::";
			cin >> ch;
                                        //taking user's choice
			if(ch==1)                   //printing the set after removing duplicate elements
				{
					obj.unique();
					cout << "The set after removing duplicates ::";
					obj.print();
				}
			else if(ch==2)                                          //printing the size of the set
				{
					cout << "Cardinality of the set ::" << obj.cardi() << endl;
				}
			else if(ch==3)                                  //printing the power set
				{
					obj.powerset();
				}
			else if(ch==4)                                  //checking member elements
				{
					int x;
					cout << "Enter the element you want to check ::";
					cin >> x;
					if(obj.ismember(x))
						cout << "The element is a member of the set.";
					else
						cout << "The element is not a member of the set.";
				}
			else                                            //handling execption
				{
					cout << "Wrong input !!" << endl;
				}
			cout << endl << "Do you want to continue (y/n)::";
			cin >> y;                                               //asking users if he wants to continue
		}
	return 0;
}
```

Output:


Command Prompt - DS_Practical-1.exe
Microsoft Windows [Version 10.0.19042.867]
(c) 2020 Microsoft Corporation. All rights reserved.
C:\Users\harsh>cd desktop
C:\Users\harsh\Desktop>cd Programs_DS
C:\Users\harsh\Desktop\Programs_DS>DS_Practical-1.exe
Enter the number of set elements ::6
Enter the elements at index 0 ::1
Enter the elements at index 1 ::22
Enter the elements at index 2 ::3
Enter the elements at index 3 ::22
Enter the elements at index 4 ::5
Enter the elements at index 5 ::1
The set you entered ::1 22 3 22 5 1
********** Menu **********
1. Remove duplicate elements.
2. Cardinality of the set.
3. Power of set.
4. Check membership of an elements
********** Menu **********
Enter your choice(1 , 2 , 3 or 4) ::1
The set after removing duplicates ::1 22 3 5
Do you want to continue (y/n)::
********** Menu **********
1. Remove duplicate elements.
2. Cardinality of the set.
3. Power of set.
4. Check membership of an elements
********** Menu **********
Enter your choice(1 , 2 , 3 or 4) ::2
Cardinality of the set ::4
Do you want to continue (y/n)::
********** Menu **********
1. Remove duplicate elements.
2. Cardinality of the set.
3. Power of set.
4. Check membership of an elements
********** Menu **********
Enter your choice(1 , 2 , 3 or 4) ::4
Enter the element you want to check ::3
The element is a member of the set.
Do you want to continue (y/n)::

```
********** Menu **********
1. Remove duplicate elements.
2. Cardinality of the set.
3. Power of set.
4. Check membership of an elements
********** Menu **********
Enter your choice(1 , 2 , 3 or 4) ::4
Enter the element you want to check ::10
The element is not a member of the set.
Do you want to continue (y/n)::
```

```
********** Menu **********
1. Remove duplicate elements.
2. Cardinality of the set.
3. Power of set.
4. Check membership of an elements
********** Menu **********
Enter your choice(1 , 2 , 3 or 4) ::3
The power of set ::
{  }
{ 1  }
{ 22  }
{ 1 22  }
{ 3  }
{ 1 3  }
{ 22 3  }
{ 1 22 3  }
{ 5  }
{ 1 5  }
{ 22 5  }
{ 1 22 5  }
{ 3 5  }
{ 1 3 5  }
{ 22 3 5  }
{ 1 22 3 5  }
```

```
Do you want to continue (y/n)::n

C:\Users\harsh\Desktop\Programs_DS>
```

Harsh Bamotra
AC-1216