

**Ardit Krasniqi**

**Drejtimi: Shkenca Kompjuterike**

**Kampusi: Prishtinë/ Lipjan**

**Viti: I parë**

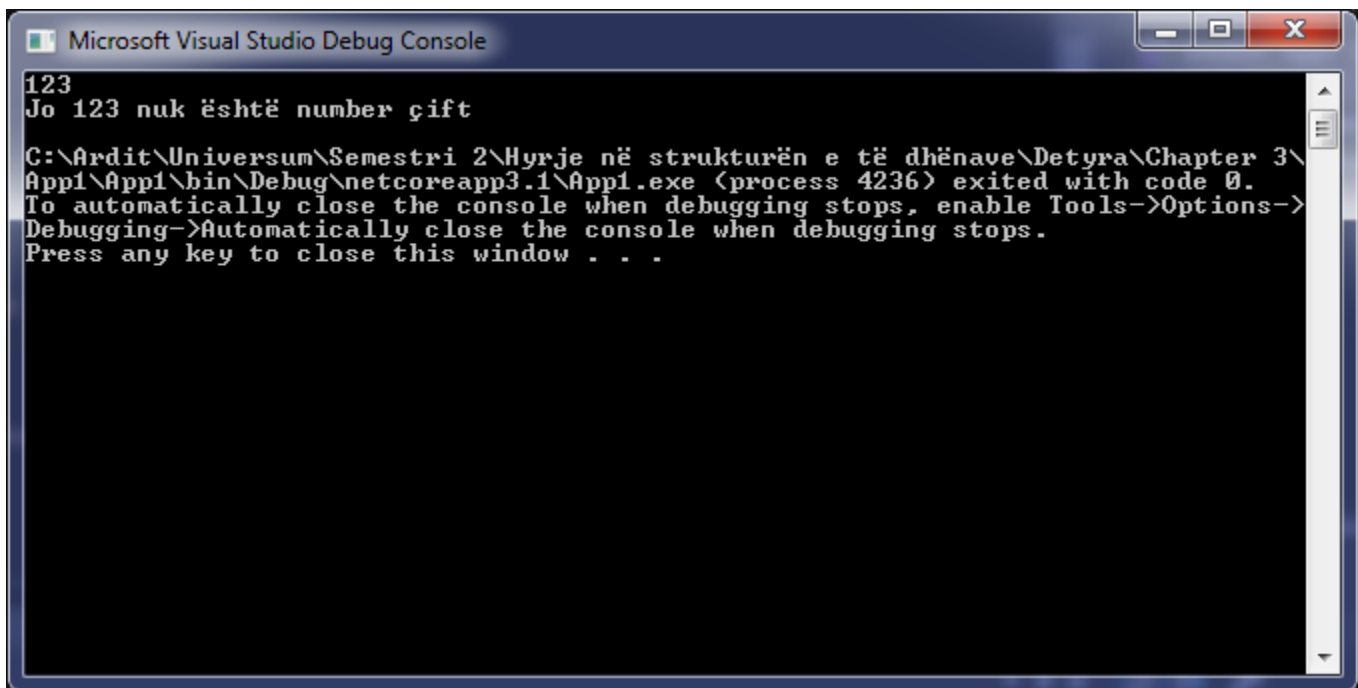
**Statusi: I rregullt**

**Chapter 3**

1. Write an expression that checks whether an integer is odd or even.

```
using System;

namespace App1
{
    class Program
    {
        static void Main(string[] args)
        {
            int numri = int.Parse(Console.ReadLine());
            if (numri % 2 == 0)
            {
                Console.WriteLine("Po {0} është number çift", numri);
            }
            else
            {
                Console.WriteLine("Jo {0} nuk është number çift", numri);
            }
        }
    }
}
```



The screenshot shows the Microsoft Visual Studio Debug Console window. The title bar reads "Microsoft Visual Studio Debug Console". The console output is as follows:

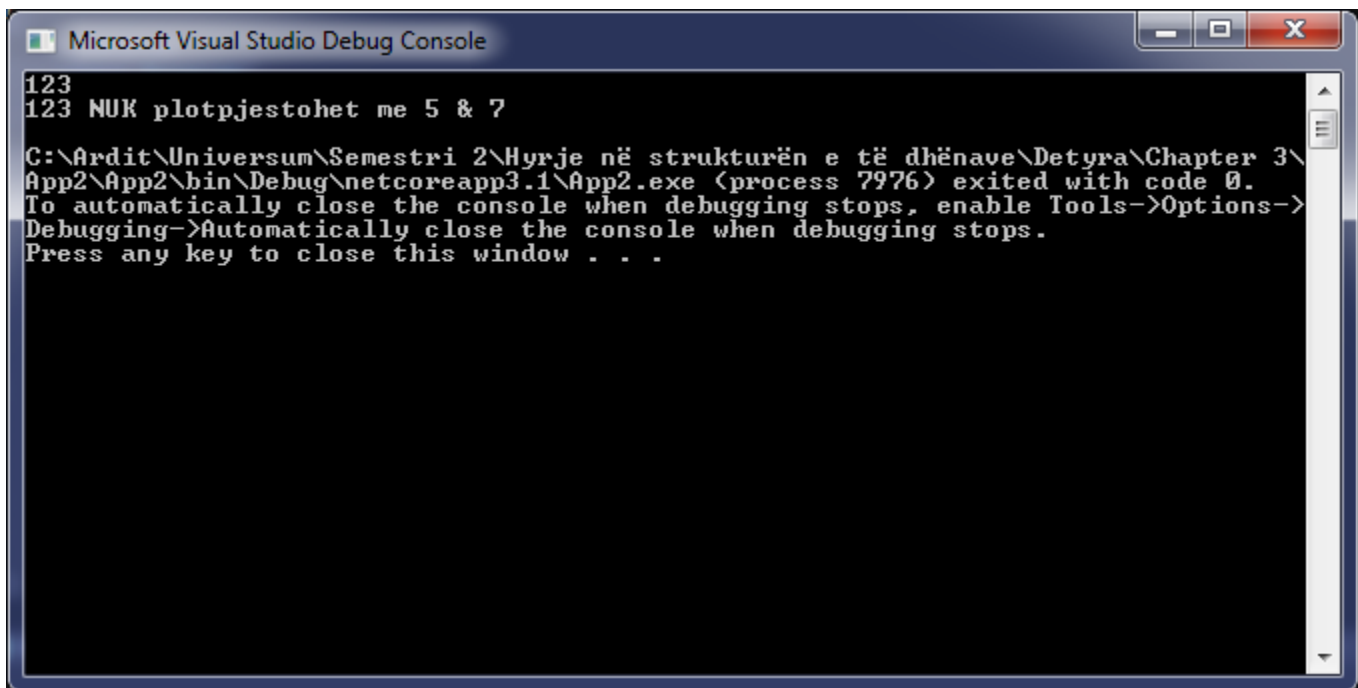
```
123
Jo 123 nuk është number çift

C:\Ardit\Universum\Semestri 2\Hyrje në strukturën e të dhënave\Detyra\Chapter 3\
App1\App1\bin\Debug\netcoreapp3.1\App1.exe (process 4236) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->
Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .
```

2. Write a Boolean expression that checks whether a given integer is divisible by both 5 and 7, without a remainder.

```
using System;

namespace App2
{
    class Program
    {
        static void Main(string[] args)
        {
            int nmb = int.Parse(Console.ReadLine());
            if (nmb % 5 == 0 && nmb % 7 == 0)
            {
                Console.WriteLine("{0} plotpjestohet me 5 & 7", nmb);
            }
            else
            {
                Console.WriteLine("{0} NUK plotpjestohet me 5 & 7", nmb);
            }
        }
    }
}
```



The screenshot shows the Microsoft Visual Studio Debug Console window. The title bar reads "Microsoft Visual Studio Debug Console". The console output is as follows:

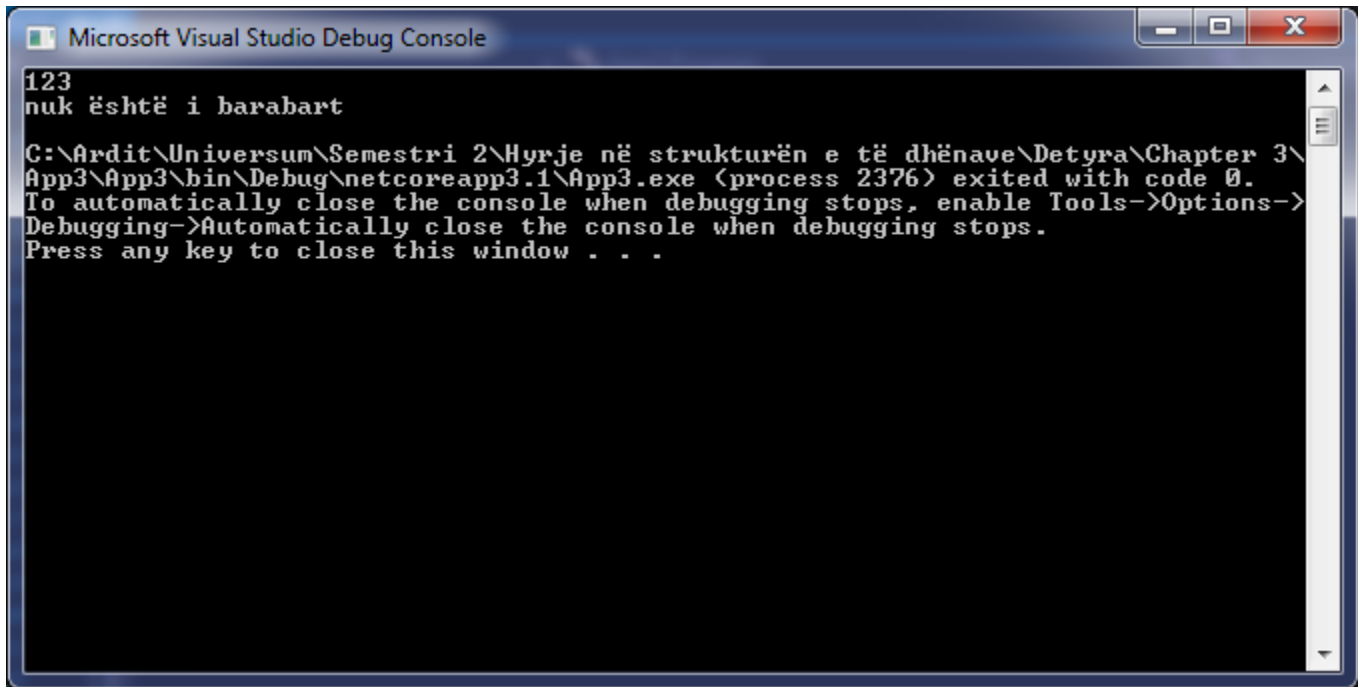
```
123
123 NUK plotpjestohet me 5 & 7

C:\Ardit\Universum\Semestri 2\Hyrje në strukturën e të dhënave\Detyra\Chapter 3\
App2\App2\bin\Debug\netcoreapp3.1\App2.exe (process 7976) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->
Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .
```

3. Write an expression that looks for a given integer if its third digit (right to left) is 7.

```
using System;

namespace App3
{
    class Program
    {
        static void Main(string[] args)
        {
            int Numri = int.Parse(Console.ReadLine());
            bool even = (Numri / 100) % 10 == 7 ? true : false ;
            if (even == true)
            {
                Console.WriteLine("është i barabartë");
            }
            else
            {
                Console.WriteLine("nuk është i barabart");
            }
        }
    }
}
```



```
Microsoft Visual Studio Debug Console

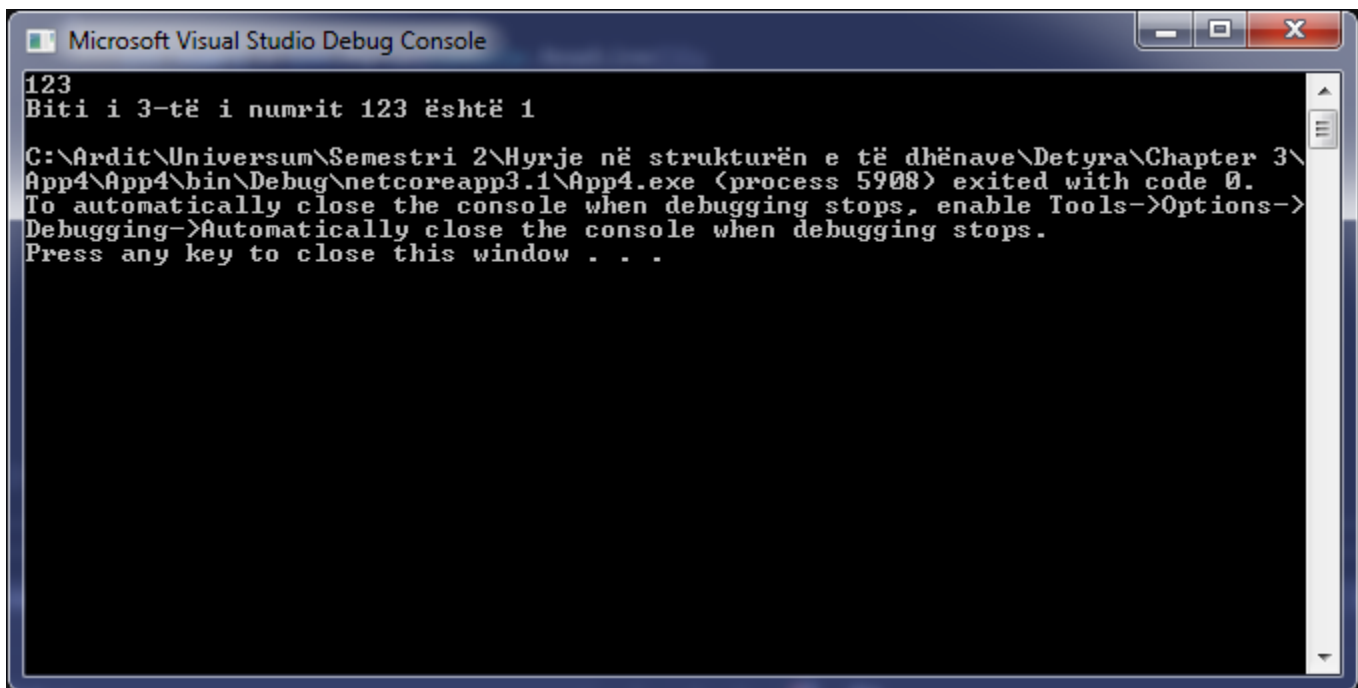
123
nuk është i barabart

C:\Ardit\Universum\Semestri 2\Hyrje në strukturën e të dhënave\Detyra\Chapter 3\
App3\App3\bin\Debug\netcoreapp3.1\App3.exe (process 2376) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->
Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .
```

4. Write an expression that checks whether the third bit in a given integer is 1 or 0.

```
using System;

namespace App4
{
    class Program
    {
        static void Main(string[] args)
        {
            int numri = int.Parse(Console.ReadLine());
            bool biti3 = (numri & 8) != 0;
            if (biti3 == true)
            {
                Console.WriteLine("Biti i 3-të i numrit {0} është 1", numri);
            }
            else
            {
                Console.WriteLine("Biti i 3-të i numrit {0} NUK është 1", numri);
            }
        }
    }
}
```



```
Microsoft Visual Studio Debug Console

123
Biti i 3-të i numrit 123 është 1

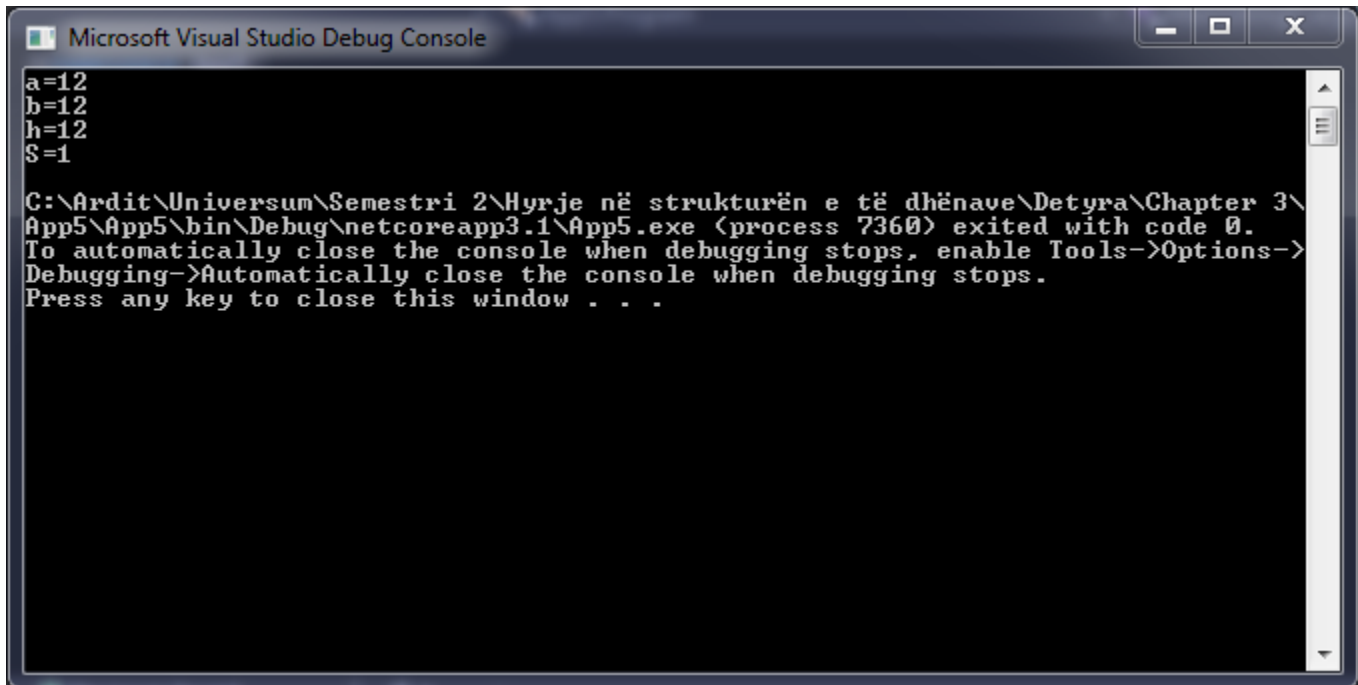
C:\Ardit\Universum\Semestri 2\Hyrje në strukturën e të dhënave\Detyra\Chapter 3\
App4\App4\bin\Debug\netcoreapp3.1\App4.exe (process 5908) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->
Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .
```

5. Write an expression that calculates the area of a trapezoid by given sides a, b and height h.

```
using System;

namespace App5
{
    class Program
    {
        static void Main(string[] args)
        {
            Console.Write("a=");
            float a = int.Parse(Console.ReadLine());
            Console.Write("b=");
            float b = int.Parse(Console.ReadLine());
            Console.Write("h=");
            float h = int.Parse(Console.ReadLine());

            Console.WriteLine("S={0}", (a + b) / (2 * h));
        }
    }
}
```



The screenshot shows the Microsoft Visual Studio Debug Console window. The console output is as follows:

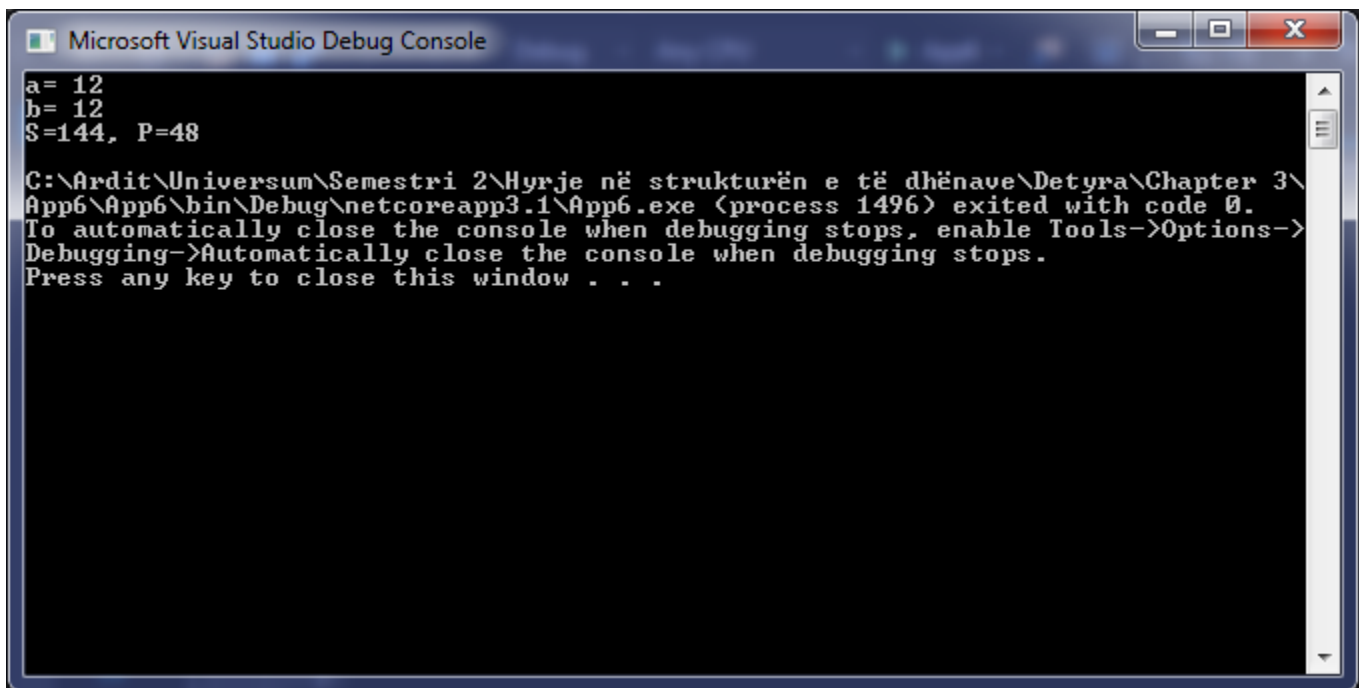
```
a=12
b=12
h=12
S=1

C:\Ardit\Universum\Semestri 2\Hyrje në strukturën e të dhënave\Detyra\Chapter 3\
App5\bin\Debug\netcoreapp3.1\App5.exe (process 7360) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->
Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .
```

6. Write a program that prints on the console the perimeter and the area of a rectangle by given side and height entered by the user.

```
using System;

namespace App6
{
    class Program
    {
        static void Main(string[] args)
        {
            Console.Write("a= ");
            int a = Convert.ToInt32(Console.ReadLine());
            Console.Write("b= ");
            int b = Convert.ToInt32(Console.ReadLine());
            Console.WriteLine("S={0}, P={1}", a * b, (a + b) * 2);
        }
    }
}
```



```
Microsoft Visual Studio Debug Console

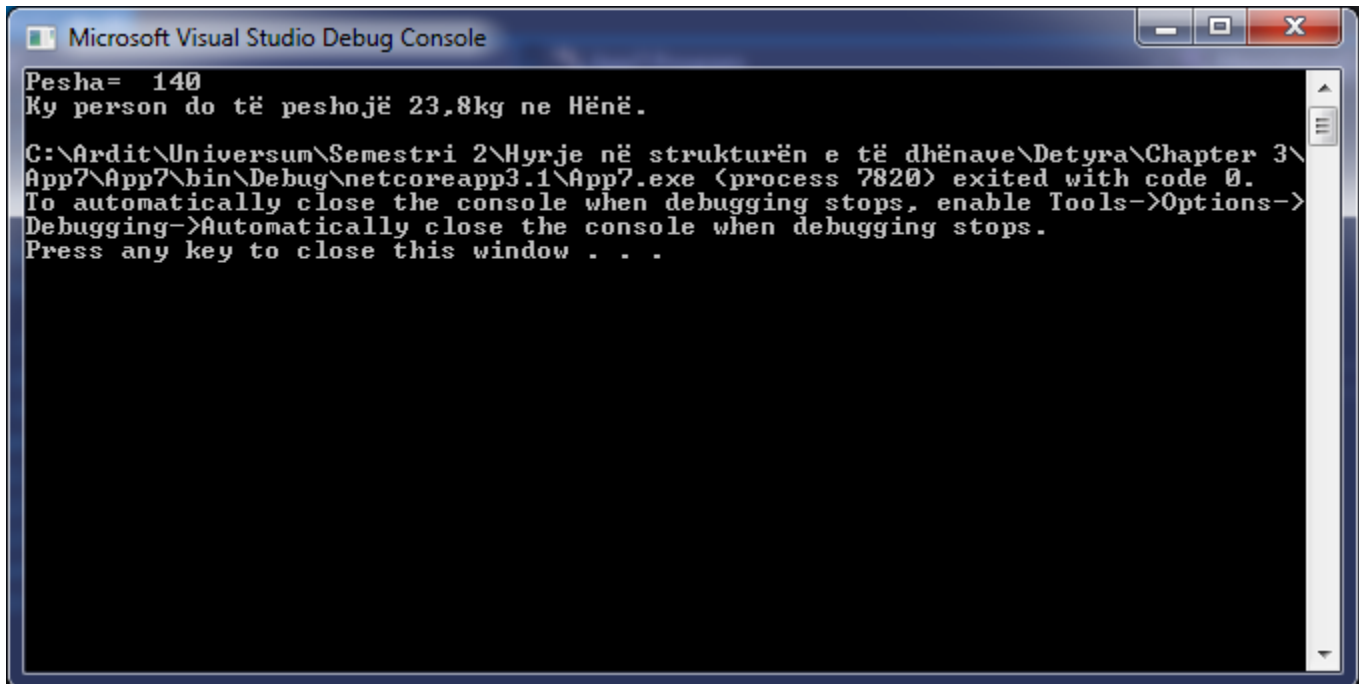
a= 12
b= 12
S=144, P=48

C:\Ardit\Universum\Semestri 2\Hyrje në strukturën e të dhënave\Detyra\Chapter 3\
App6\bin\Debug\netcoreapp3.1\App6.exe (process 1496) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->
Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .
```

7. The gravitational field of the Moon is approximately 17% of that on the Earth. Write a program that calculates the weight of a man on the moon by a given weight on the Earth.

```
using System;

namespace App7
{
    class Program
    {
        static void Main(string[] args)
        {
            Console.Write("Pesha= ");
            int weight = Convert.ToInt32(Console.ReadLine());
            Console.WriteLine("Ky person do të peshojë {0}kg ne Hënë.", weight * 0.17);
        }
    }
}
```



The screenshot shows the Microsoft Visual Studio Debug Console window. The title bar reads "Microsoft Visual Studio Debug Console". The console output is as follows:

```
Pesha= 140
Ky person do të peshojë 23,8kg ne Hënë.

C:\Ardit\Universum\Semestri 2\Hyrje në strukturën e të dhënave\Detyra\Chapter 3\
App7\App7\bin\Debug\netcoreapp3.1\App7.exe (process 7820) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->
Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .
```



8. Write an expression that checks for a given point  $\{x, y\}$  if it is within the circle  $K(\{0, 0\}, R=5)$ . Explanation: the point  $\{0, 0\}$  is the center of the circle and 5 is the radius.

```
using System;

namespace App8
{
    class Program
    {
        static void Main(string[] args)
        {
            Console.Write("x= ");
            int x = Convert.ToInt32(Console.ReadLine());
            Console.Write("y= ");
            int y = Convert.ToInt32(Console.ReadLine());
            bool isInside = (x * x + y * y <= 5) ? true : false;
            Console.WriteLine("Pika O({0},{1}) është brenda K((0,0),5)? : {2}", x, y, isInside);
        }
    }
}
```

9. Write an expression that checks for given point  $\{x, y\}$  if it is within the circle  $K(\{0, 0\}, R=5)$  and out of the rectangle  $\{-1, 1\}, \{5, 5\}$ . Clarification: for the rectangle the lower left and the upper right corners are given.

```
using System;
```

```
namespace App9
```

```
{  
    class Program  
    {  
        static void Main(string[] args)  
        {  
            Console.Write("x= ");  
            int x = int.Parse(Console.ReadLine());  
            Console.Write("y= ");  
            int y = int.Parse(Console.ReadLine());  
            int R = 5;  
  
            if ((x * x) + (y * y) <= R * R && (x < -1 || y < 1))  
            {  
                Console.WriteLine("Pika {{0} , {1}} është brenda rrethit me radius {1}  
dhe jashtë drejtkëndëshit.", x, y, R);  
            }  
            else  
            {  
                Console.WriteLine("Pika {{0} , {1}} është jashtë rrethit me radius {1}  
dhe jashtë drejtkëndëshit.", x, y, R);  
            }  
        }  
    }  
}
```

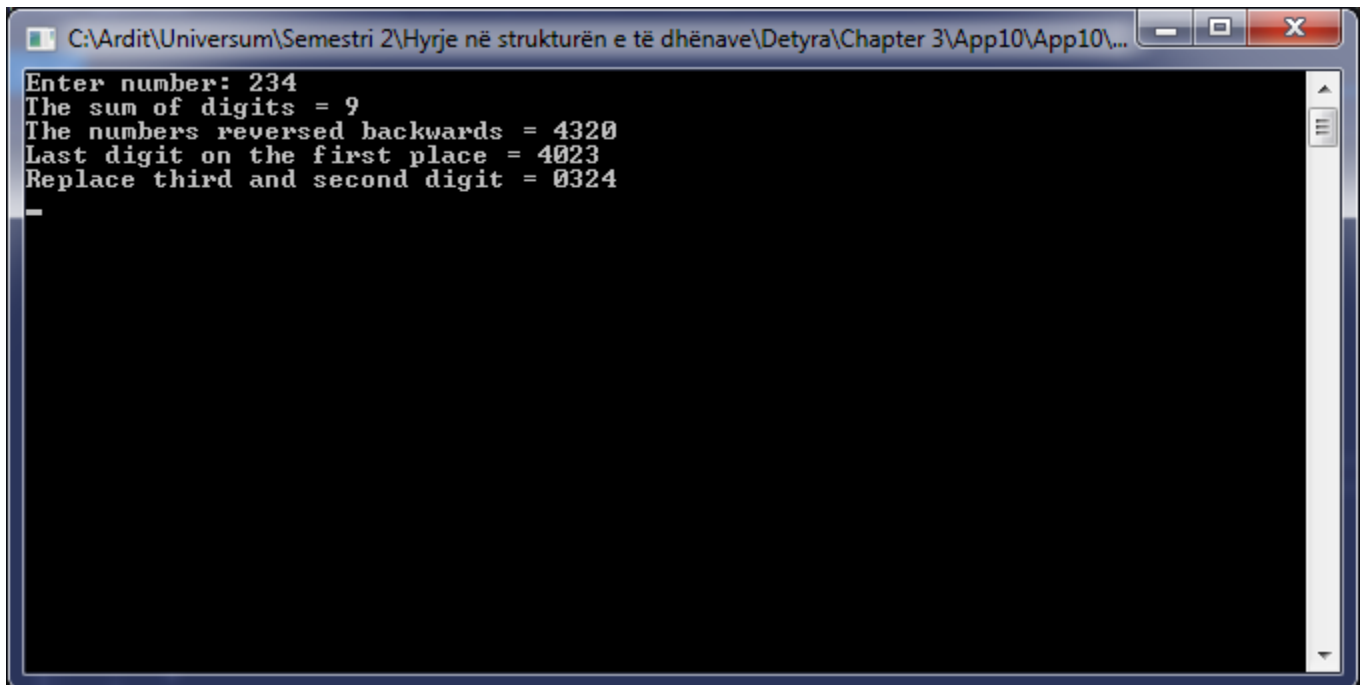
10. Write a program that takes as input a four-digit number in format abcd (e.g. 2011) and performs the following actions: - Calculates the sum of the digits (in our example  $2+0+1+1 = 4$ ). - Prints on the console the number in reversed order: dcba (in our example 1102). - Puts the last digit in the first position: dabc (in our example 1201). - Exchanges the second and the third digits: acbd (in our example 2101). Chapter 3. Operators and Expressions 161

```
using System;

namespace App10
{
    class Program
    {
        static void Main(string[] args)
        {
            Console.Write("Enter number: ");
            int number = Convert.ToInt32(Console.ReadLine());
            int a = number / 1000;
            int b = (number / 100) % 10;
            int c = (number / 10) % 10;
            int d = number % 10;

            Console.WriteLine("The sum of digits = {0}", a + b + c + d);
            Console.WriteLine("The numbers reversed backwards = {3}{2}{1}{0}", a, b, c, d);
            Console.WriteLine("Last digit on the first place = {3}{0}{1}{2}", a, b, c, d);
            Console.WriteLine("Replace third and second digit = {0}{2}{1}{3}", a, b, c, d);

            Console.ReadKey();
        }
    }
}
```



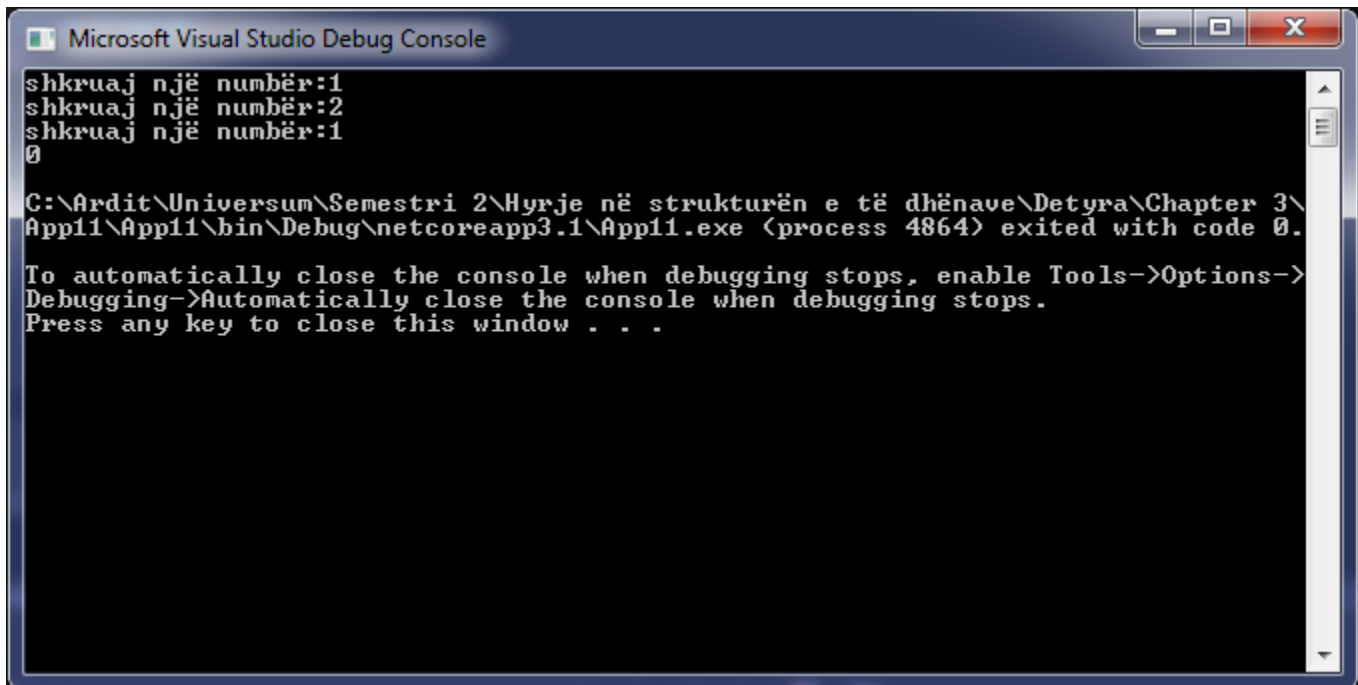
```
C:\Ardit\Universum\Semestri 2\Hyrje në strukturën e të dhënave\Detyra\Chapter 3\App10\App10\...
Enter number: 234
The sum of digits = 9
The numbers reversed backwards = 4320
Last digit on the first place = 4023
Replace third and second digit = 0324
```

11. We are given a number  $n$  and a position  $p$ . Write a sequence of operations that prints the value of the bit on the position  $p$  in the number (0 or 1). Example:  $n=35, p=5 \rightarrow 1$ . Another example:  $n=35, p=6 \rightarrow 0$ .

```
using System;

namespace App11
{
    class Program
    {
        static void Main(string[] args)
        {
            Console.Write("shkruaj një numër:");
            int n = int.Parse(Console.ReadLine());
            Console.Write("shkruaj një numër:");
            int p = int.Parse(Console.ReadLine());
            Console.Write("shkruaj një numër:");
            int i = int.Parse(Console.ReadLine());
            int mask = i << p;

            Console.WriteLine((n & mask) != 0 ? 1 : 0);
        }
    }
}
```



```
Microsoft Visual Studio Debug Console

shkruaj një numër:1
shkruaj një numër:2
shkruaj një numër:1
0

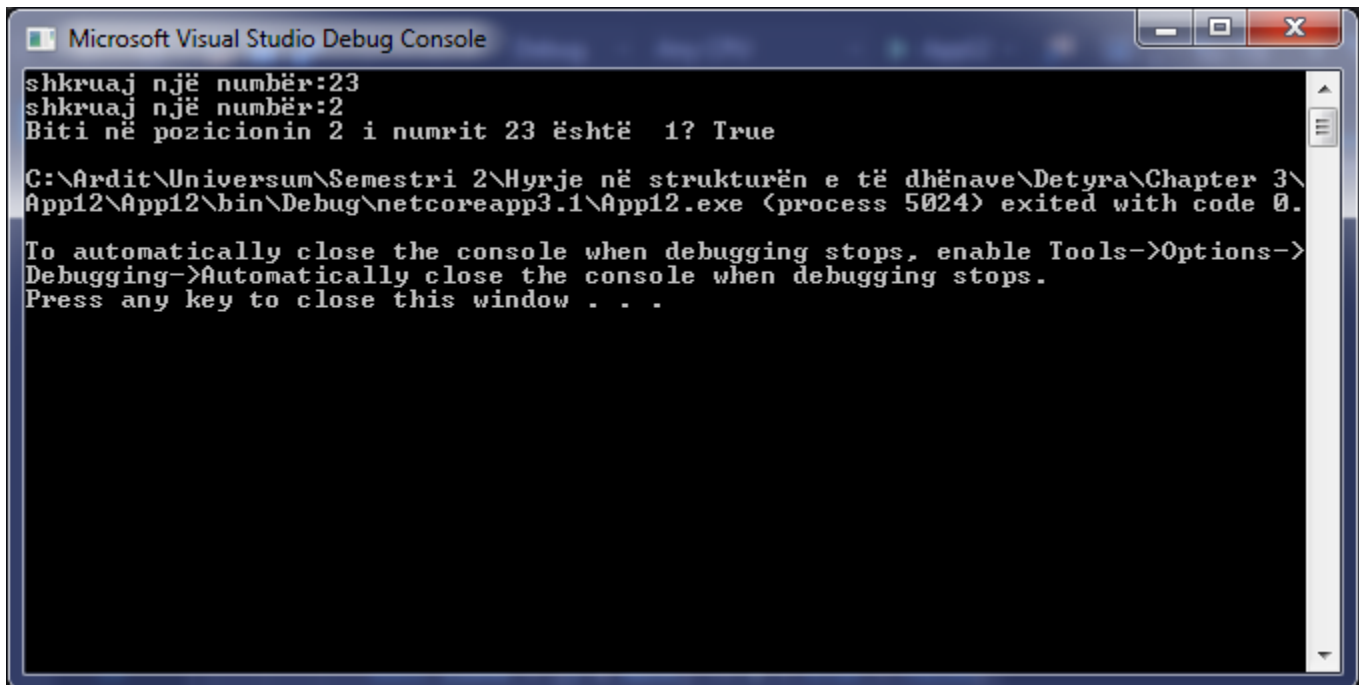
C:\Ardit\Universum\Semestri 2\Hyrje në strukturën e të dhënave\Detyra\Chapter 3\
App11\App11\bin\Debug\netcoreapp3.1\App11.exe (process 4864) exited with code 0.

To automatically close the console when debugging stops, enable Tools->Options->
Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .
```

12. Write a Boolean expression that checks if the bit on position p in the integer v has the value 1. Example v=5, p=1 -> false.

```
using System;

namespace App12
{
    class Program
    {
        static void Main(string[] args)
        {
            Console.Write("shkruaj një numër:");
            int v = int.Parse(Console.ReadLine());
            Console.Write("shkruaj një numër:");
            int p = int.Parse(Console.ReadLine());
            int mask = 1 << p;
            bool isOne = (v & mask) != 0 ? true : false;
            Console.WriteLine("Biti në pozicionin {0} i numrit {1} është 1? {2}", p, v, isOne);
        }
    }
}
```



```
Microsoft Visual Studio Debug Console

shkruaj një numër:23
shkruaj një numër:2
Biti në pozicionin 2 i numrit 23 është 1? True

C:\Ardit\Universum\Semestri 2\Hyrje në strukturën e të dhënave\Detyra\Chapter 3\
App12\App12\bin\Debug\netcoreapp3.1\App12.exe (process 5024) exited with code 0.

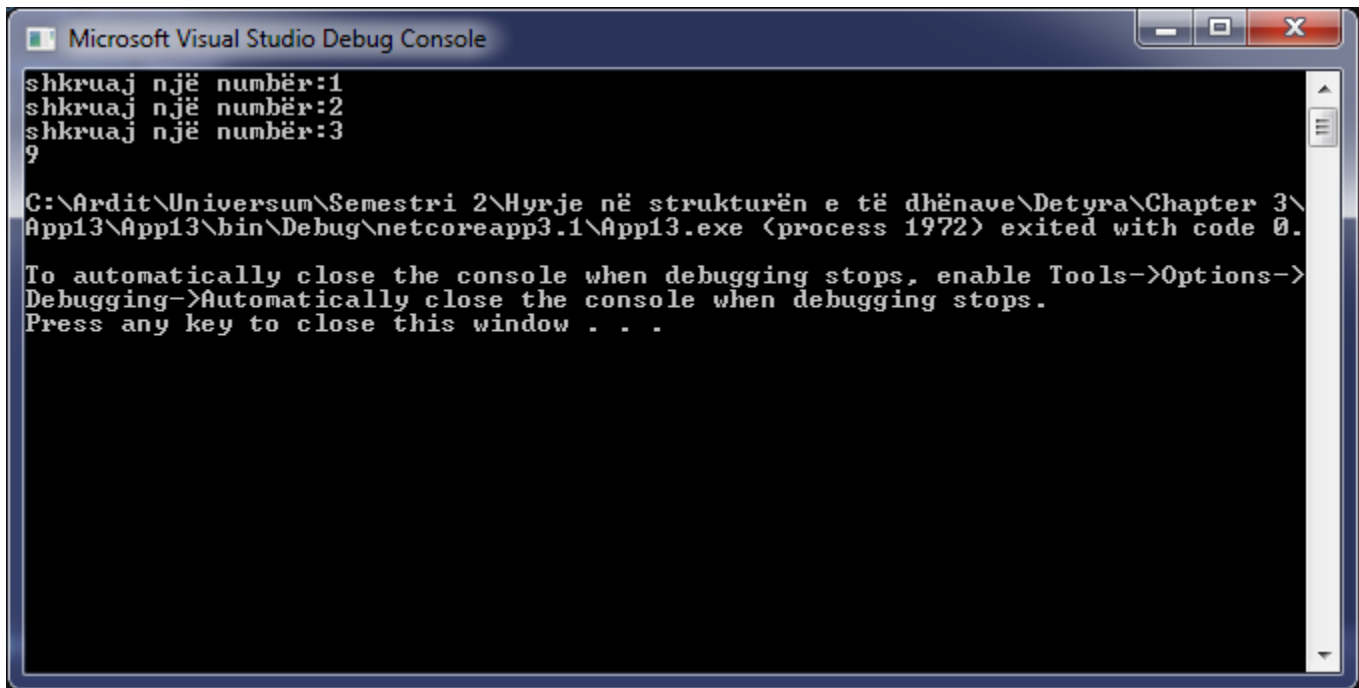
To automatically close the console when debugging stops, enable Tools->Options->
Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .
```

13. We are given the number  $n$ , the value  $v$  ( $v = 0$  or  $1$ ) and the position  $p$ . write a sequence of operations that changes the value of  $n$ , so the bit on the position  $p$  has the value of  $v$ . Example:  $n=35$ ,  $p=5$ ,  $v=0 \rightarrow n=3$ . Another example:  $n=35$ ,  $p=2$ ,  $v=1 \rightarrow n=39$ .

```
using System;
```

```
namespace App13
```

```
{  
    class Program  
    {  
        static void Main(string[] args)  
        {  
            Console.Write("shkruaj një numër:");  
            int n = int.Parse(Console.ReadLine());  
            Console.Write("shkruaj një numër:");  
            int v = int.Parse(Console.ReadLine());  
            Console.Write("shkruaj një numër:");  
            int p = int.Parse(Console.ReadLine());  
            n = (v == 0) ? n = n & ~(1 << p) : n = n | (1 << p);  
            Console.WriteLine(n);  
        }  
    }  
}
```

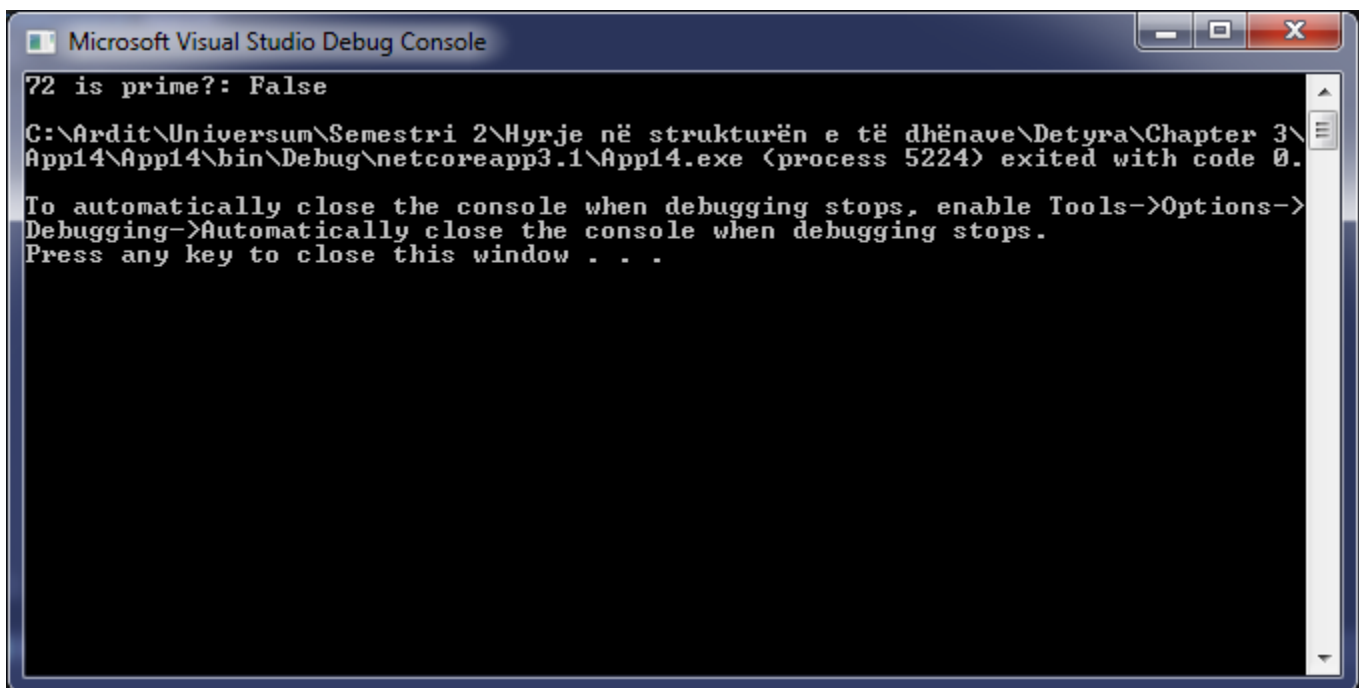


```
Microsoft Visual Studio Debug Console  
shkruaj një numër:1  
shkruaj një numër:2  
shkruaj një numër:3  
9  
C:\Ardit\Universum\Semestri 2\Hyrje në strukturën e të dhënave\Detyra\Chapter 3\App13\App13\bin\Debug\netcoreapp3.1\App13.exe (process 1972) exited with code 0.  
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the console when debugging stops.  
Press any key to close this window . . .
```

14. Write a program that checks if a given number  $n$  ( $1 < n < 100$ ) is a prime number (i.e. it is divisible without remainder only to itself and 1).

```
using System;

namespace App14
{
    class Program
    {
        static void Main(string[] args)
        {
            int number = 72;
            bool isPrime = true;
            if (number > 2)
                for (int i = 2; i <= Math.Ceiling(Math.Sqrt(number)); ++i)
                {
                    if (number % i == 0) isPrime = false;
                }
            Console.WriteLine("{0} is prime?: {1}", number, isPrime);
        }
    }
}
```



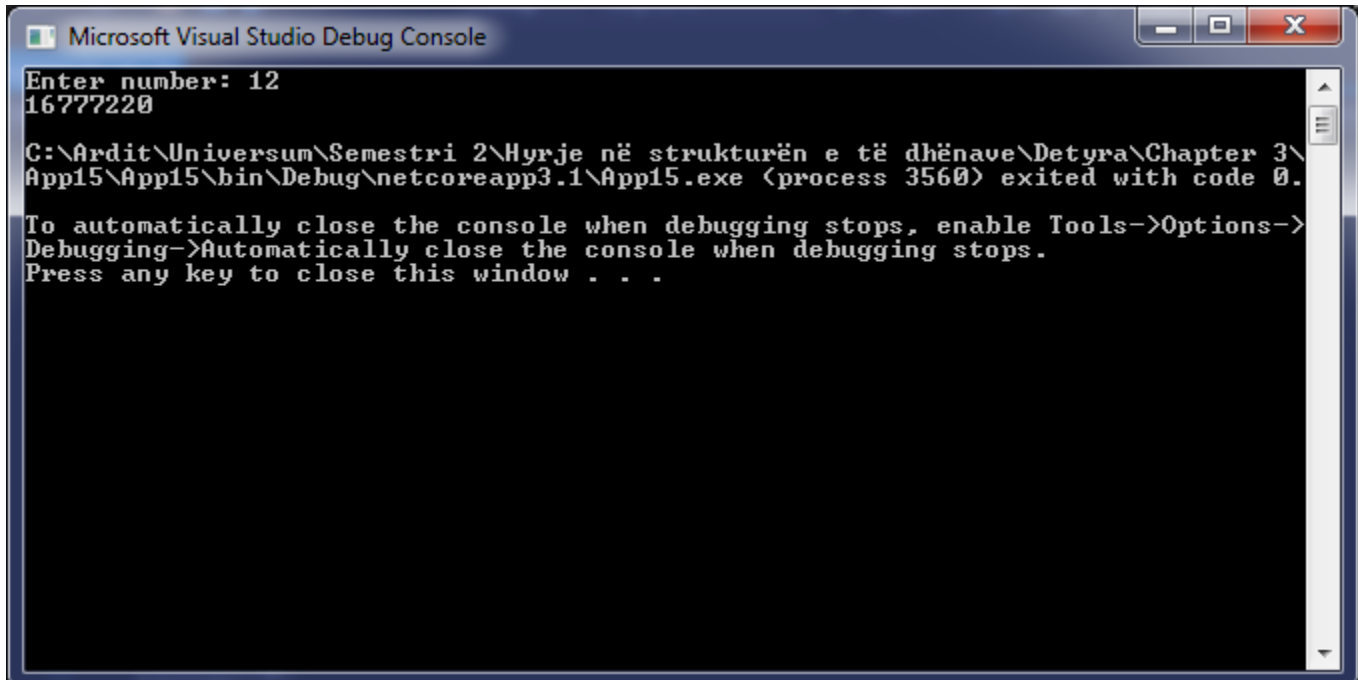
15. \* Write a program that exchanges the values of the bits on positions 3, 4 and 5 with bits on positions 24, 25 and 26 of a given 32-bit unsigned integer.

```
using System;

namespace App15
{
    class Program
    {
        static void Main(string[] args)
        {
            Console.Write("Enter number: ");
            int v = Convert.ToInt32(Console.ReadLine());
            int mask = 1 << 3;
            int bitAt3 = (v & mask) != 0 ? 1 : 0;
            mask = 1 << 4;
            int bitAt4 = (v & mask) != 0 ? 1 : 0;
            mask = 1 << 5;
            int bitAt5 = (v & mask) != 0 ? 1 : 0;
            mask = 1 << 24;
            int bitAt24 = (v & mask) != 0 ? 1 : 0;
            mask = 1 << 25;
            int bitAt25 = (v & mask) != 0 ? 1 : 0;
            mask = 1 << 26;
            int bitAt26 = (v & mask) != 0 ? 1 : 0;

            v = (bitAt3 == 0) ? v = v & (~(1 << 24)) : v = v | (1 << 24);
            v = (bitAt4 == 0) ? v = v & (~(1 << 25)) : v = v | (1 << 25);
            v = (bitAt5 == 0) ? v = v & (~(1 << 26)) : v = v | (1 << 26);
            v = (bitAt24 == 0) ? v = v & (~(1 << 3)) : v = v | (1 << 3);
            v = (bitAt25 == 0) ? v = v & (~(1 << 4)) : v = v | (1 << 4);
            v = (bitAt26 == 0) ? v = v & (~(1 << 5)) : v = v | (1 << 5);

            Console.WriteLine(v);
        }
    }
}
```





16. \* Write a program that exchanges bits {p, p+1, ..., p+k-1} with bits {q, q+1, ..., q+k-1} of a given 32-bit unsigned integer.

```
using System;
```

```
namespace App16
```

```
{
    class Program
    {
        static void Main(string[] args)
        {
            int[] pBits = new int[k];
            int[] qBits = new int[k];

            for (int position = p, i = 0; i < pBits.Length; position++, i++)
            {
                pBits[i] = PthBit(number, position);
            }

            for (int position = q, i = 0; i < qBits.Length; position++, i++)
            {
                qBits[i] = PthBit(number, position);
            }

            for (int position = p, i = 0; i < qBits.Length; position++, i++)
            {
                number = ModifiedNumber(number, position, qBits[i]);
            }

            for (int position = q, i = 0; i < pBits.Length; position++, i++)
            {
                number = ModifiedNumber(number, position, pBits[i]);
            }

            return number;
        }

        private static int PthBit(uint number, int position)
        {
            uint pthBit = (number >> position) & 1;
            return (int)pthBit;
        }

        private static uint ModifiedNumber(uint number, int position, int bitValue)
        {
            uint actualP = (uint)bitValue << position;
            number = number & ~(uint)1 << position;
            uint result = number | actualP;
            return result;
        }

        static void Main(string[] args)
        {
            Console.Write("Enter number: ");
            uint number = uint.Parse(Console.ReadLine());
            Console.Write("Enter p: ");
            int p = int.Parse(Console.ReadLine());
            Console.Write("Enter q: ");
            int q = int.Parse(Console.ReadLine());
            Console.Write("Enter k: ");
            int k = int.Parse(Console.ReadLine());
        }
    }
}
```

```

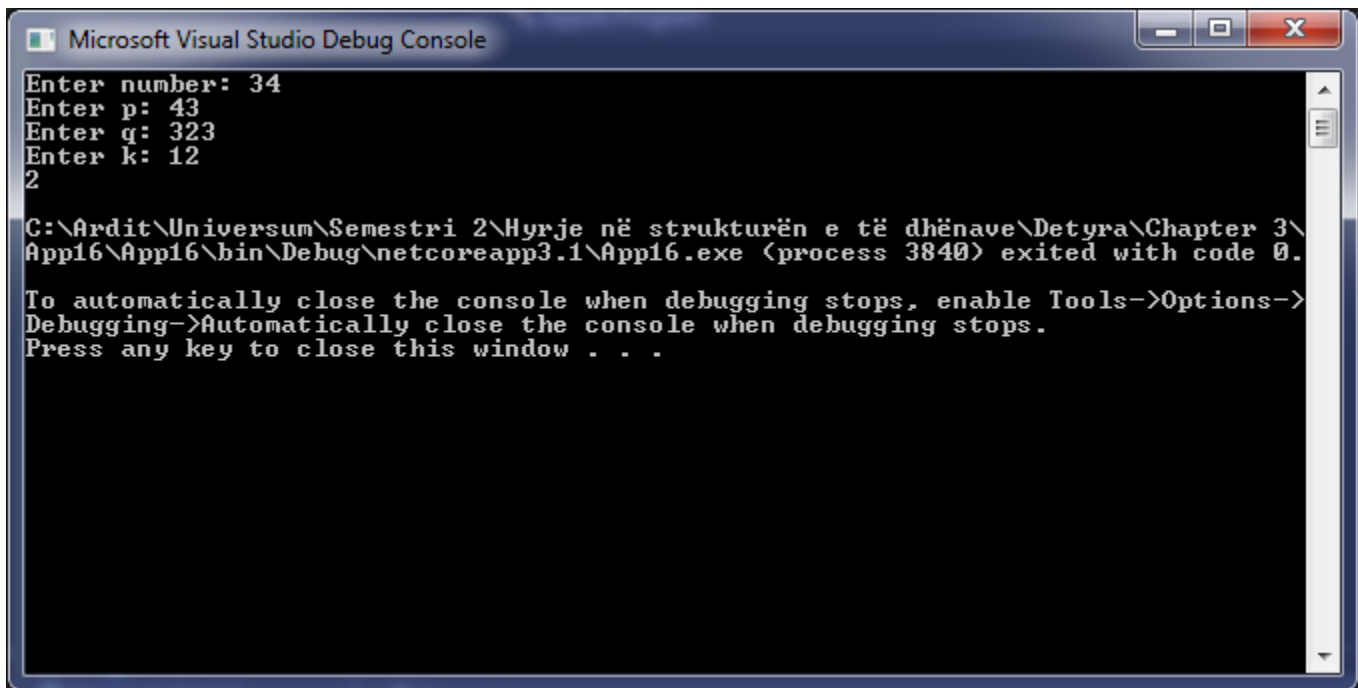
        if (p > q)
        {
            int oldValue = p;
            p = q;
            q = oldValue;
        }

        if (p + k >= q)
        {
            k += p - q - 1;
            q += p + k + 1;
        }

        number = ModifyNumber(number, p, q, k);

        Console.WriteLine(number);
    }
}

```



The screenshot shows the Microsoft Visual Studio Debug Console window. The title bar reads "Microsoft Visual Studio Debug Console". The console output is as follows:

```

Enter number: 34
Enter p: 43
Enter q: 323
Enter k: 12
2
C:\Ardit\Universum\Semestri 2\Hyrje në strukturën e të dhënave\Detyra\Chapter 3\
App16\App16\bin\Debug\netcoreapp3.1\App16.exe (process 3840) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->
Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .

```