C++ NUMBER SYSTEM CALCULATOR

DOCUMENTATION

BY

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Converts a decimal number to the specified base.

Parameters

num: The decimal number to be converted. base:

The target base for conversion.

Returns

A string representing the number in the target base.

Details

The function uses a loop to convert the integer part of the decimal number to the target base.

It handles both integer and fractional parts separately, including a specified number of decimal places.

2. Base To Decimal

Converts a number from any base to decimal.

Parameters

num: The number in the source base as a string. base:

The source base of the input number.

Returns

The decimal equivalent of the input number.

Details

The function iterates through the input string, separating the integer and fractional parts.

It uses mathematical operations to calculate the decimal equivalent.

Usage

Enter the number to be converted.

Enter the source base (2 for binary, 8 for octal, 10 for decimal, 16 for hexadecimal).

Enter the target base (2 for binary, 8 for octal, 10 for decimal, 16 for hexadecimal).

The program will then display the result of the conversion.

C++ CONVERTER PROGRAM

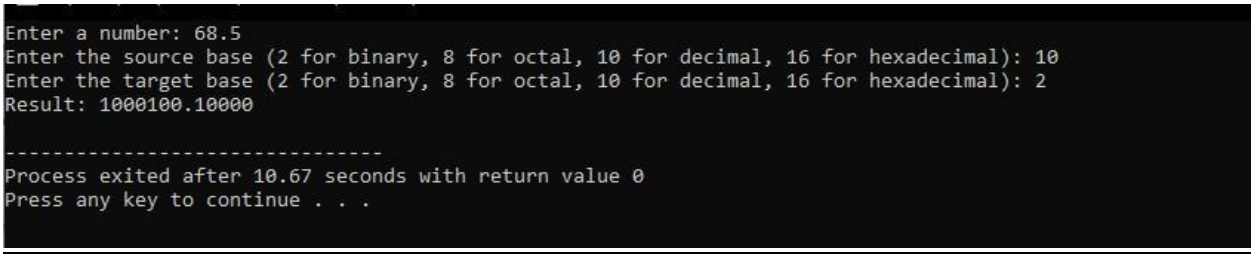
```cpp
#include <iostream>
#include <cmath>
using namespace std;
string decimalToBase(double num, int base);
double baseToDecimal(const string& num, int base);

int main() {
    double num;
    int sourceBase, targetBase;
    string inputNum, result;

    cout << "Enter a number: ";
    cin >> inputNum;

    cout << "Enter the source base (2 for binary, 8 for octal, 10 for decimal, 16 for hexadecimal): ";
    cin >> sourceBase;

    cout << "Enter the target base (2 for binary, 8 for octal, 10 for decimal, 16 for hexadecimal): ";
    cin >> targetBase;

    num = baseToDecimal(inputNum, sourceBase);
    result = decimalToBase(num, targetBase);

    cout << "Result: " << result << std::endl;

    return 0;
```

```
}
// Function to convert a decimal number to another base
    string decimalToBase(double num, int base) {
    string result = "";
    int intPart = static_cast<int>(num);//coverts from double to int data 1type
    double fracPart = num - intPart;//: Calculate the fractional part of the decimal number by subtrac

    //Start a loop that will continue until the integer part (intPart) becomes zero. This loop is used
    while (intPart > 0) {
        int remainder = intPart % base;
        result = (remainder < 10) ? char('0' + remainder) + result : char('A' + remainder - 10) + resu
        intPart /= base;
    }

    if (fracPart > 0) {
        result += ".";
        for (int i = 0; i < 5; i++) {  // Specify the number of decimal places to convert
            fracPart *= base;
            int digit = static_cast<int>(fracPart);
            result += (digit < 10) ? char('0' + digit) : char('A' + digit - 10);
            fracPart -= digit;
        }
    }

```

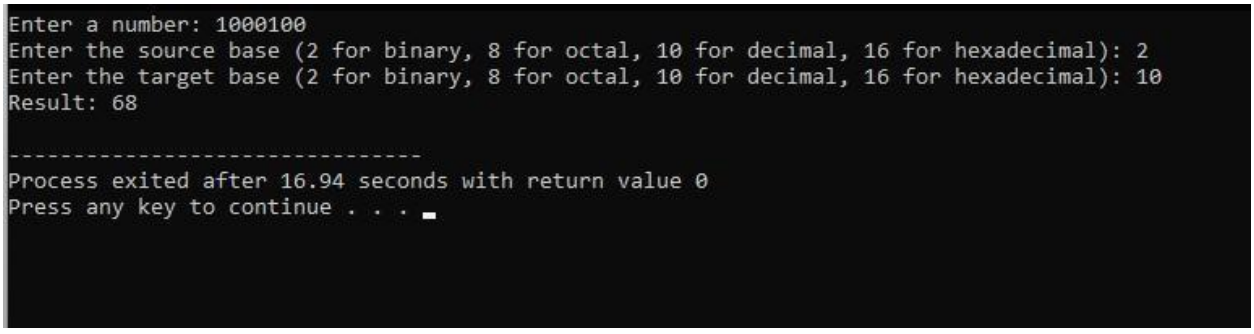
CODE SNIPPET CONVERTING FROM DECIMAL TO BINARY

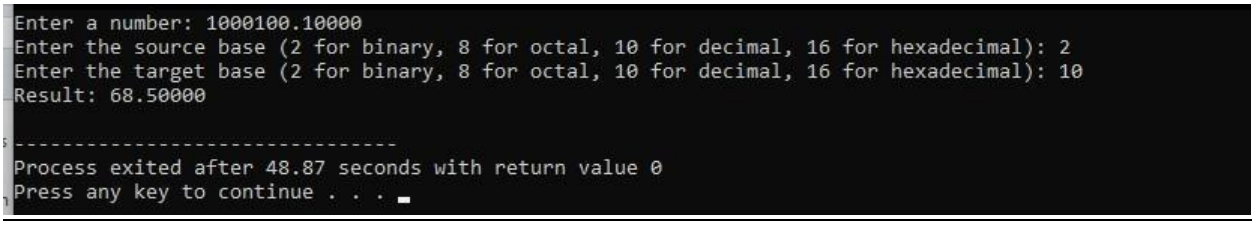
```
Enter a number: 68
Enter the source base (2 for binary, 8 for octal, 10 for decimal, 16 for hexadecimal): 10
Enter the target base (2 for binary, 8 for octal, 10 for decimal, 16 for hexadecimal): 2
Result: 1000100

--------------------------------
Process exited after 21.42 seconds with return value 0
Press any key to continue . . .
```

FRACTIONAL PART CONVERTION

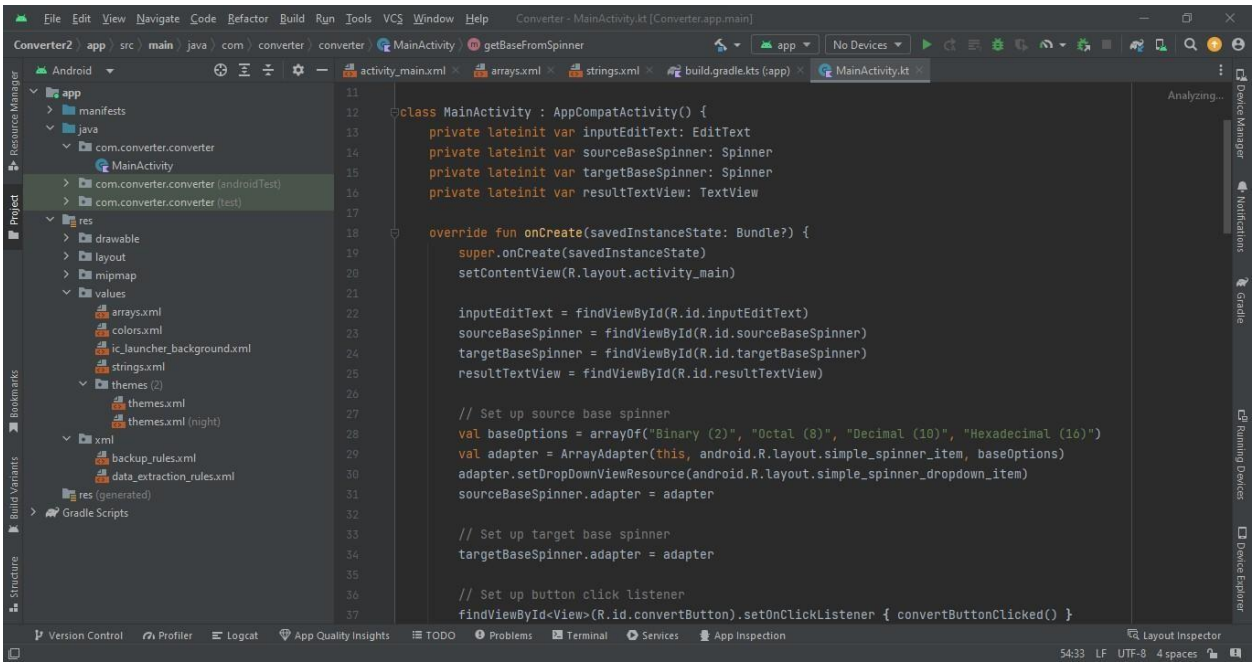


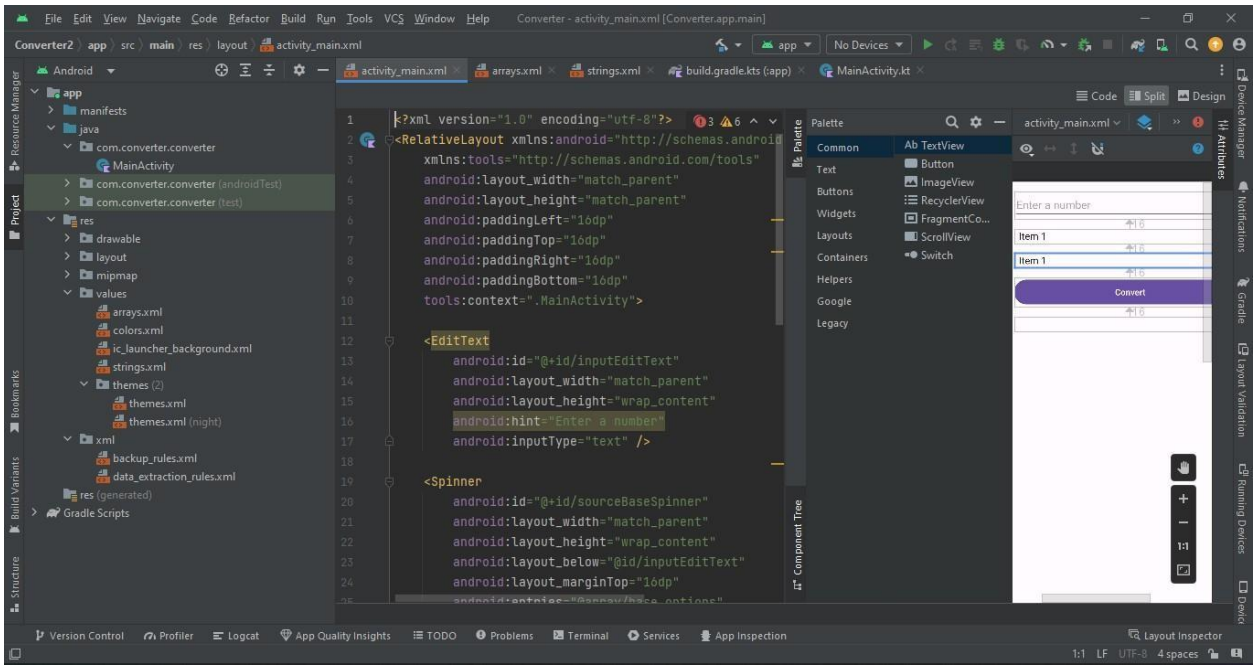
CODE SNIPPET CONVERTING FROM DECIMAL TO BINARY





WE CONVERTED THE C++ CODE TO KOTLIN TO ENABLE IT TO RUN AS AN ANDROID APP





C++ CODE CONVERTED TO KOTLIN

package com.converter.converter

import android.os.Bundle import android.view.View

import android.widget.ArrayAdapter import

```
android.widget.EditText import android.widget.Spinner
import android.widget.TextView import
androidx.appcompat.app.AppCompatActivity import
kotlin.math.pow

class MainActivity : AppCompatActivity() {
private lateinit var inputEditText: EditText     private
lateinit var sourceBaseSpinner: Spinner     private
lateinit var targetBaseSpinner: Spinner     private
lateinit var resultTextView: TextView

   override fun onCreate(savedInstanceState: Bundle?) {
super.onCreate(savedInstanceState)
setContentView(R.layout.activity_main)

      inputEditText = findViewById(R.id.inputEditText)
sourceBaseSpinner = findViewById(R.id.sourceBaseSpinner)
targetBaseSpinner = findViewById(R.id.targetBaseSpinner)
resultTextView = findViewById(R.id.resultTextView)

      // Set up source base spinner        val baseOptions = arrayOf("Binary (2)", "Octal (8)",
"Decimal (10)", "Hexadecimal (16)")        val adapter = ArrayAdapter(this,
android.R.layout.simple_spinner_item, baseOptions)
adapter.setDropDownViewResource(android.R.layout.simple_spinner_dropdown_item)
sourceBaseSpinner.adapter = adapter
```

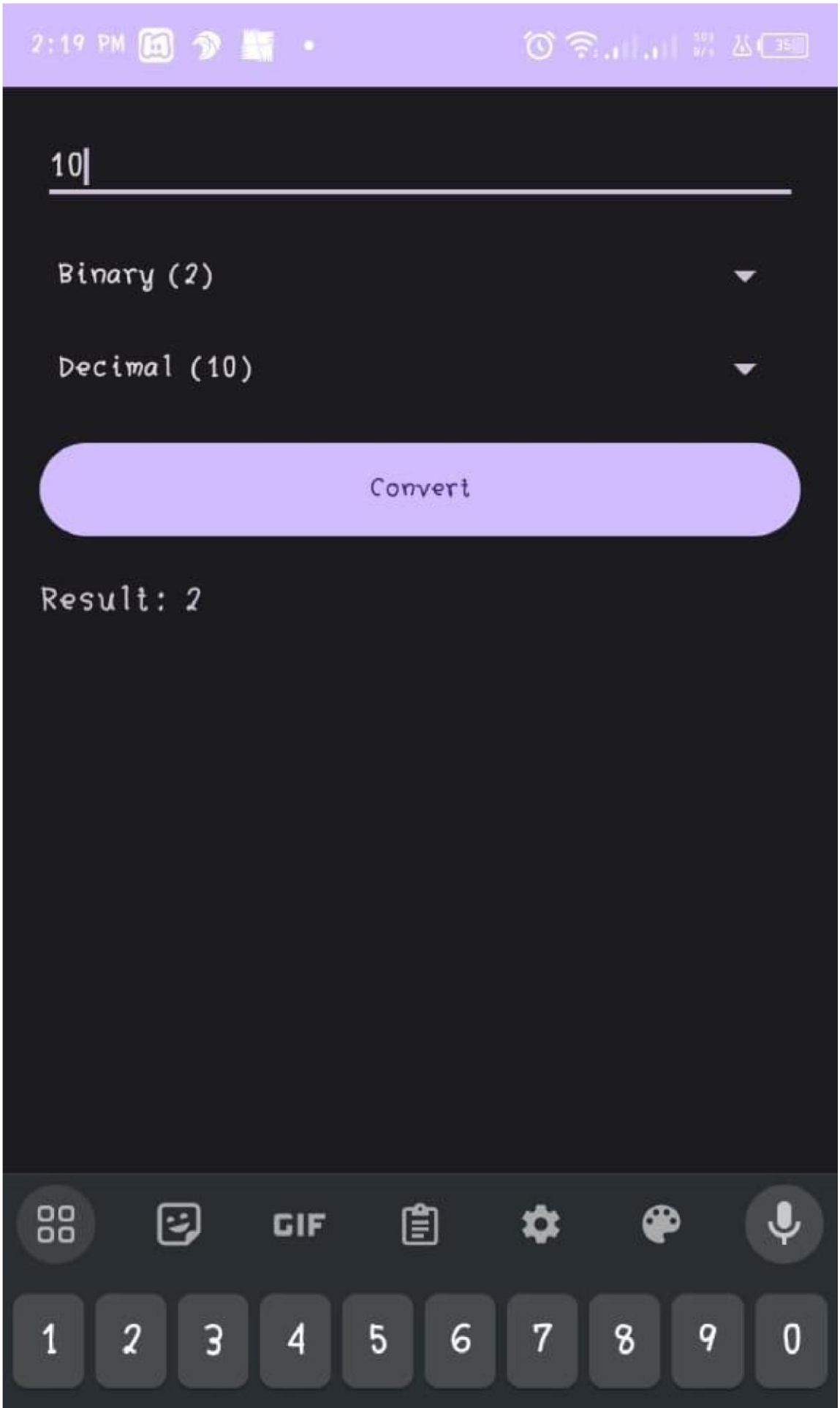
```
        // Set up target base spinner        targetBaseSpinner.adapter
= adapter        // Set up button
click listener
findViewById<View>(R.id.convertButton).setOnClickListener
{ convertButtonClicked() }
    }

    private fun convertButtonClicked() {        val inputNum =
inputEditText.text.toString()        val sourceBase =
getBaseFromSpinner(sourceBaseSpinner)        val targetBase =
getBaseFromSpinner(targetBaseSpinner)

        val num = baseToDecimal(inputNum, sourceBase)        val
result = decimalToBase(num, targetBase)

        resultTextView.text = "Result: $result"
    }

    private fun getBaseFromSpinner(spinner: Spinner): Int {
val selectedItem = spinner.selectedItem as String        return
when {            selectedItem.contains("Binary") -> 2
selectedItem.contains("Octal") -> 8
selectedItem.contains("Decimal") -> 10
selectedItem.contains("Hexadecimal") -> 16
```

```
            else -> 10
        }
    }

    // Function to convert a decimal number to another base
private fun decimalToBase(num: Double, base: Int): String {
        var result = ""         var intPart
= num.toInt()         var fracPart =
num - intPart

        while (intPart > 0) {             val
remainder = intPart % base             result
= if (remainder < 10) {
                ('0' + remainder).toString() + result
            } else {
                ('A' + remainder - 10).toString() + result
            }
            intPart /= base
        }

        if (fracPart > 0) {             result += "."             for (i in 0 until 5) {  // Specify
the number of decimal places to convert                 fracPart *= base
val digit = fracPart.toInt()                 result += if (digit < 10) {
                    ('0' + digit).toString()
```

```
            } else {
                ('A' + digit - 10).toString()
            }
            fracPart -= digit
        }
    }

    return result
}

// Function to convert a number from any base to decimal
private fun baseToDecimal(num: String, base: Int): Double {
    var result = 0.0        var intPart = 0
var francPart = 0.0        val decimalPosition
= num.indexOf('.')

    for (i in num.indices) {            if (i <
decimalPosition) {                intPart = intPart * base + if
(num[i].isDigit()) {
                (num[i] - '0')
            } else {
                (num[i].uppercaseChar() - 'A' + 10)
            }
        } else if (i > decimalPosition) {                francPart
+= if (num[i].isDigit()) {
```

```
                (num[i] - '0')
            } else {
                (num[i].uppercaseChar() - 'A' + 10)
            } * base.toDouble().pow(i - decimalPosition)
        }
    }

    result = intPart + francPart        return
result
  }
```

APP INTERFACE


2:19 PM
10
Binary (2)
Decimal (10)
Convert
Result: 2
GIF
1 2 3 4 5 6 7 8 9 0