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Lab Practical #14:

Implementation of parity bit check Using C/Java language with example.

Practical Assignment #14:

1. C/Java Program: Implementation of parity bit check Using C/Java language.

```c
#include <stdio.h>

int calculateParity(int data[], int size, int isEvenParity)
{
    int count = 0;
    for (int i = 0; i < size; i++)
    {
        if (data[i] == 1)
        {
            count++;
        }
    }

    if (isEvenParity)
    {
        return (count % 2 == 0) ? 0 : 1;
    }
    else
    {
        return (count % 2 == 0) ? 1 : 0;
    }
}

int verifyParity(int data[], int size, int receivedParityBit, int isEvenParity)
{
    int oneCount = 0;
    for (int i = 0; i < size; i++)
    {
        if (data[i] == 1)
        {
            oneCount++;
        }
    }

    if (receivedParityBit == 1)
    {
        oneCount++;
    }
```

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```
    if (isEvenParity)
    {
        return (oneCount % 2 == 0);
    }
    else
    {
        return (oneCount % 2 != 0);
    }
}

int main()
{
    int data[] = {1, 0, 1, 1, 0, 1};
    int size = sizeof(data) / sizeof(data[0]);
    int isEvenParity;

    printf("Choose the parity type:\n");
    printf("  Enter 1 for Even Parity\n");
    printf("  Enter 0 for Odd Parity\n");
    printf("Your choice: ");
    scanf("%d", &isEvenParity);

    if (isEvenParity != 0 && isEvenParity != 1)
    {
        printf("Invalid choice. Please run again and enter 0 or 1.\n");
        return 1;
    }

    printf("\nOriginal Data: ");
    for (int i = 0; i < size; i++)
    {
        printf("%d", data[i]);
    }
    printf("\n");

    printf("Parity Type Selected: %s\n", isEvenParity ? "Even" : "Odd");

    int parityBit = calculateParity(data, size, isEvenParity);
    printf("Sender: Calculated Parity Bit is %d\n", parityBit);
    printf("Sender: Full message to send is ");
    for (int i = 0; i < size; i++)
    {
        printf("%d", data[i]);
    }
    printf("%d\n", parityBit);
```

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```
    printf("\n--- Simulating Data Reception ---\n");

    int receivedData[size];

    printf("Enter the %d bits of the data you 'received':\n", size);
    for (int i = 0; i < size; i++)
    {
        printf("Enter bit %d: ", i + 1);
        scanf("%d", &receivedData[i]);
    }

    int receivedParityBit = parityBit;

    printf("\nReceiver: Checking received message ");
    for (int i = 0; i < size; i++)
    {
        printf("%d", receivedData[i]);
    }
    printf("%d\n", receivedParityBit);

    if (verifyParity(receivedData, size, receivedParityBit, isEvenParity))
    {
        printf("Result: Parity check PASSED.(Data is considered correct)\n");
    }
    else
    {
        printf("Result: Parity check FAILED. (Error detected)\n");
    }

    return 0;
}
```