BCSE307P

Compiler Design Lab

Lab Assignment 6

VIT®

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1. A Program for Loop Unrolling.

CODE:

```c
#include <stdio.h>

#define size 10

void loop_unrolled_sum(int arr[], int n) {
    int sum = 0;
    for (int i = 0; i < n; i += 5) {
        sum += arr[i];
        sum += arr[i + 1];
        sum += arr[i + 2];
        sum += arr[i + 3];
        sum += arr[i + 4];
    }
    printf("Sum: %d\n", sum);
}

int main() {
    int arr[size] = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10};
    loop_unrolled_sum(arr, size);
    return 0;
}
```

OUTPUT:

```
Sum: 55


...Program finished with exit code 0
Press ENTER to exit console.
```

2. A program to implement back patching.

CODE:

```
class BackPatch:
    def __init__(self):
        self.code = []
        self.patch_table = {}

    def generate_code(self, instruction):
        self.code.append(instruction)

    def create_patch_point(self):
        patch_point = len(self.code)
        self.code.append(None)
        return patch_point

    def patch_value(self, patch_point, value):
        self.code[patch_point] = value

    def print_code(self):
        for i, instruction in enumerate(self.code):
            if instruction is None:
                print(f"Address {i}: <not patched>")
            else:
                print(f"Address {i}: {instruction}")

bp = BackPatch()

bp.generate_code("LOAD R1, 10")
bp.generate_code("LOAD R2, 20")

patch_point = bp.create_patch_point()

bp.generate_code("ADD R1, R2")

bp.patch_value(patch_point, "STORE R1, 30")

bp.print_code()
```

OUTPUT:

```
[Running] python -u "c:\Users\ISHAN\OneDrive\Desktop\Semester-5\Compiler\Lab\bp.py"
Address 0: LOAD R1, 10
Address 1: LOAD R2, 20
Address 2: STORE R1, 30
Address 3: ADD R1, R2

[Done] exited with code=0 in 0.274 seconds
```

Result: The programs for Loop unrolling and Backpatching are executed and output screenshots given.