

# AI LAB 6-

## Constraints and Satisfaction –

### Crypt arithmetic problems

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#### CODE:

```
import itertools

def get_value(word, substitution):
    s = 0
    factor = 1
    for letter in reversed(word):
        s += factor * substitution[letter]
        factor *= 10
    return s

def solve2(equation):
    # split equation in left and right
    left, right = equation.lower().replace(' ', '').split('==')
    # split words in left part
    left = left.split('+')
    # create list of used letters
    letters = set(right)
    for word in left:
        for letter in word:
            letters.add(letter)
    letters = list(letters)

    digits = range(10)
    for perm in itertools.permutations(digits, len(letters)):
        sol = dict(zip(letters, perm))

        if sum(get_value(word, sol) for word in left) == get_value(right, sol):
            print(' + '.join(str(get_value(word, sol)) for word in left) + " = {} (mapping: {})".format(get_value(right, sol), sol))

if __name__ == '__main__':
```

```
solve2('COMPLEX + LAPLACE == CALCULUS')
```

## OUTPUT:

```
29     if sum(get_value(word, sol) for word in left) == get_value(right, sol):
30         print(' '.join(str(get_value(word, sol)) for word in left) + " = {} (mapping: {})".format(get_value(right, sol), mapping))
31
32 if __name__ == '__main__':
33     solve2('COMPLEX + LAPLACE == CALCULUS')
34
```

1864925 + 9049012 = 10913937 (mapping: {'u': 3, 'o': 8, 's': 7, 'a': 0, 'l': 9, 'm': 6, 'x': 5, 'c': 1, 'p': 4, 'e': 2})