Programming Paradigms & Practices

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Software Engineer

Outline

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5. Overview of deployment models and strategies

Understanding Programming Paradigms

Definition *wikipedia*

Programming paradigms are fundamental styles or approaches to computer programming, offering distinct methodologies for designing and structuring software.

Importance *ChatGPT*

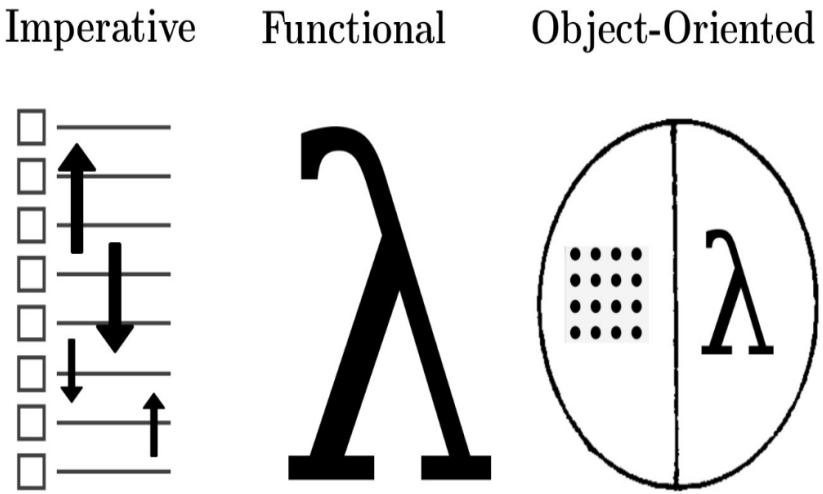
Understanding different programming paradigms is crucial for selecting the right approach to solve specific problems, leading to more efficient and maintainable code.

Historical Context **wikipedia**

Programming paradigms have evolved over time, with significant contributions from various programming languages that introduced unique features and concepts, shaping the way we write software today.

Programming Paradigms Types

- Imperative Programming
- Procedural Programming
- Object-Oriented Programming
- Declarative Programming
- Functional Programming
- Event-Driven Programming
- Aspect-Oriented Programming
- Reactive Programming



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```c
#include <stdio.h>

int main() {
  int Salaries[] = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10};
  int N = sizeof(Salaries) / sizeof(Salaries[0]);
  int result = 0, i;

  for (i = 0; i < N; i++) {
    if (Salaries[i] % 2 == 0) {
      result += Salaries[i];
    }
  }

  printf("Sum of even salaries is %d", result);
  return 0;
}
```

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#include <stdio.h>

int SumEven(int arr[], int N) {
    int sum = 0;
    int i;

    for (i = 0; i < N; i++) {
        if (arr[i] % 2 == 0) {
            sum += arr[i];
        }
    }

    return sum;
}

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

    int result = SumEven(arr, 10);

    printf("sumi of even numbers is %d \n" , result);

    return 0;
}
```

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- *let's try an example*

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```sql
SELECT COUNT(CustomerID), Country
FROM Customers
GROUP BY Country
ORDER BY COUNT(CustomerID) DESC;
```

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sumList :: [Int] -> Int
sumList = foldl (+) 0                          -- Higher Order Function

main = do
    let salaries = [1,2,3,4,5,6,7,8,9,10]
    print ("result = ", sumList salaries)     -- result = 55
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```java
import java.util.Arrays;

class SalarySum {

  public static void main(String[] args) {
    int[] salaries = new int[] {1, 2, 3, 4, 5, 6, 7, 8, 9, 10};

    int result = Arrays.stream(salaries)
                       .reduce(0, (a, b) -> a + b);

    System.out.println("result = " + result);   // result = 55
  }
}
```

Advanced Programming Techniques

- Multithreading and Concurrency

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- Memory Management and Optimization
- Effective Error Handling and Debugging

Project Structure and Code Quality

- Organizing Your Codebase
- Implementing Best Practices for Readability and Maintainability
- Writing Clean and Testable Code
- Integrating Continuous Integration and Automated Testing

Deployment Models

- Understanding Different Deployment Strategies
- Containerization and Orchestration with Docker and Kubernetes
- Continuous Deployment and Delivery Pipelines
- Monitoring and Maintaining Production Environments

Conclusion

- Recap of Key Learnings
- Emerging Trends in Software Development