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CS315-003

HOME WORK 3

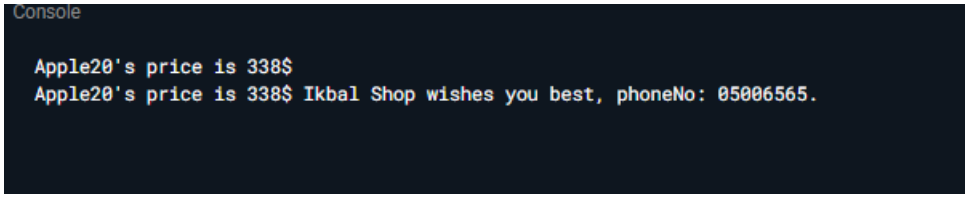
1. DESIGN ISSUES

A. Nested subprogram definitions

CODE:

```
void main() {

  String model = "Apple20";
  int year= 2020;
  int price = 10;

  double tax = calculateTax(price,year);//NESTED SUBPROGRAM 1

  double totalPrice = price + tax ;

  String outputMsg = '$model\'s price is $totalPrice\$ ';
  print (outputMsg);

  String shop = 'Ikbal Shop';
  String phoneNo = '05006565.';
  String output = nestedSubprograms(outputMsg,shop,phoneNo);//NESTED SUBPROGRAM 2
  print (output);

}

//NESTED SUBPROGRAM DEFINITION 1
double calculateTax(int aPrice, int aYear){   // Outer Program

  double priceCalculator(int aPrice, int aYear) {  // inner/nested subprogram
    return aPrice + aYear * (0.15);
  }
  double fixedTax = 15;
  return fixedTax + priceCalculator(aPrice,aYear);

}

//NESTED SUBPROGRAM DEFINITION 2
String nestedSubprograms(String m1,m2,m3){ //3 nested subprograms returns an message output

  String nested1(String message1){
   String nested2(String message2){
     String nested3(String message3){
        return message1 + message2 + ' wishes you best, phoneNo: ' + message3 +'\n';
      }
      return nested3(m3); // message3
    }
    return nested2(m2);     //message2
  }
  return nested1(m1);          // message1
}
```

OUTPUT:



On the above Dart Code , **//NESTED SUBPROGRAM DEFINITION 1** demonstrates that inner functions(**//inner nested subprogram**) belongs to its outer program**(//Outer Program**) . Only outer program can access to the inner function by calling it. Outer functions cannot use their inner function variables however inner functions can use outer function variables. In **//NESTED SUBPROGRAM DEFINITION 2** it can be observed that nested3 can access variables of nested2 and nested1 however, invers direction is not possible.

B. Scope of local variables

CODE:

```
  //2-Scope of local variables

   String model2 = ' BMW M4'; // model2 MAIN SCOPE
   int year2 = 2022;         // year2 MAIN SCOPE
   void printModelOuter(){
    String model2 = 'AUDI A4'; //model2 OUTER SCOPE
     int price2 = 5000;      // price2 OUTER SCOPE
     String no2 = '#10';     // no2 OUTER SCOPE
     void printModelInner(){
      String no2 = '#30'; // no2 INNER SCOPE
      print("Second Model is $model2 " " $year2 " + " $no2 " +"  $price2\$");
   }
     printModelInner();
   }
   printModelOuter();
  print("Second Model is $model2 " " $year2 " ); //LOCAL VARIABLE MAIN SCOPE

}
```

OUTPUT:

On the above Dart Code, AUDIA4 M4 print shows that //model2 OUTER SCOPE changed the value of //MODEL2 MAIN SCOPE it demonstrates that Dart Language uses innermost scope. On the //no2 INNER SCOPE no2 defined again so it changed the //no2 OUTER SCOPE from #10 to #30 it also corrects the inner most use. At the end on //LOCALVARIABLES MAIN SCOPE it prints the main scope values that BMW M4 2022 so inner scope variables are removed when the scope ends.

C. Parameter passing methods

CODE:

```
  //3-Parameter passing methods
    int noI = 7; // MAIN SCOPE LOCAL VARIABLE
     paramaterPass("ikbal",noI);
}

//END OF MAIN

  paramaterPass(String s1,int n1) {
    n1++;
   print(s1 + " has the number $n1" );

}
```

OUTPUT:

```
mercedes 4's price is 20318$
mercedes 4's price is 20318$ Ikbal Shop wishes you best, phoneNo: 05006565.

Second Model is AUDI A4  2022  #30   5000$
Second Model is  BMW M4  2022
ikbal has the number 8
```

On the above Dart Code, it can be seen that user can edit the value passed to the function. Value changed from 7 to 8. A parameter can be defined when calling function as seen in **“ikbal”** or can be defined before as **nol** seen.

D. Keyword and default parameters

CODE:

```dart
  //4- Keyword and default parameters

   keywordDefault("Ahmet",parameter2:777); // NAMED PARAMETER2 CALLING

   keywordDefault("Mehmet"); // IF THE PARAMETER2 IS NOT ENTERED, DEFAULT VARIABLE WILL BE SHOWN

}//END OF MAIN

   void keywordDefault(String parameter1, {int parameter2 = 300})
   {
     print(parameter1 +" $parameter2");

   }
```

OUTPUT:

```
mercedes 4's price is 20318$
mercedes 4's price is 20318$ Ikbal Shop wishes you best, phoneNo: 05006565.

Second Model is AUDI A4  2022  #30   5000$
Second Model is  BMW M4  2022
ikbal has the number 8
Ahmet 777
Mehmet 300
```

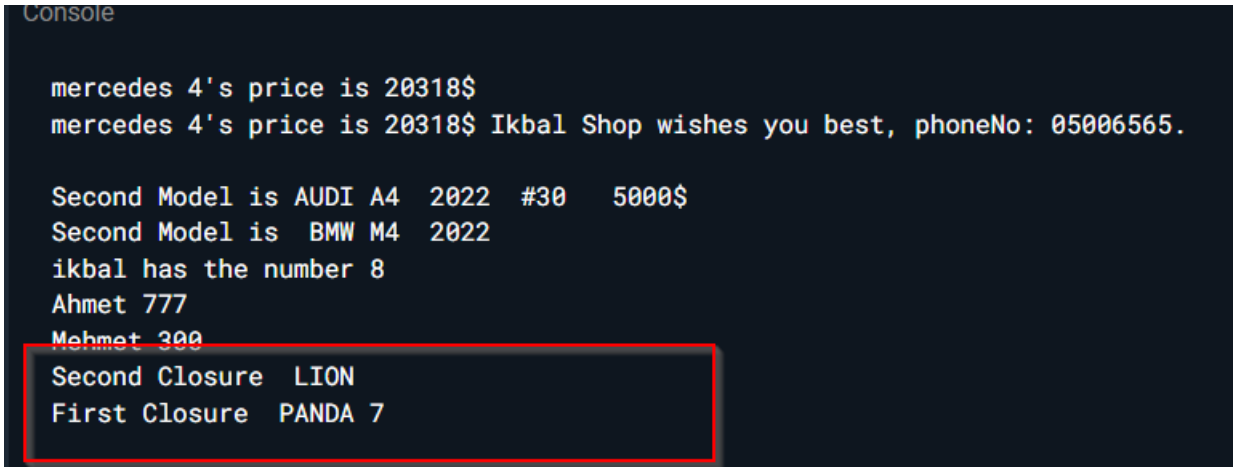
On the above Dart Code, **keyword parameter2** called with **parameter:777**, when it is not called as seen **“Mehmet”** example, it is defined as **300 default value to parameter2** of **“Mehmet”.**

E. Closures

CODE:

```
  //5-Closures

     var out1= (String name,int no) { // 1st Closure is Created

       print('First Closure $name'+ "$no"); // 1st Closure function
      };


  (String name)  { // 2nd Closure is Created and called directly
    print('Second Closure $name'); //2snd closure function
  }(' LION '); // SECOND CLOSURE IS CALLED

  out1(' PANDA ',7); // FIRST CLOSURE IS CALLED

}//END OF MAIN
```

OUTPUT:



On the above Dart Code, it can be seen that var out1 is created as closure 1 and closure2 created and called directly printed “Second Closure LION” then at the end of main out1(‘PANDA’, 7) called closure1 and printed it.

2. LANGUAGE EVALUATION

The Dart language is good in terms of writability because it leads us to change variables in passing variables as seen in the C. Parameter passing methods. In terms of readability it might be complicated to understand closure structure other than that it is good such as variable declarations so in general it is average in terms of readability.

3. LEARNING STRATEGY

I used https://dart.dev/. Website to learn about the concepts considered in this homework, and read the subprogram part from the course book. Finally I compiled my project with https://dartpad.dev website.