|  |  |
| --- | --- |
| Nama |  |
| NIM |  |
| OSP | 2016 |

1. No.26

|  |
| --- |
| Kode Program Dalam Soal : *(Soal Dirapikan)* |
| const  MAXS = 10;  var  i, n : integer;  A : array[1..10] of integer;    procedure klik();  begin  i := i-1;  end;    function klek(x : integer) : integer;  begin  if(x = MAXS) then  klek := A[x] \* A[1]  else  klek := A[x] \* A[x+1];  end;    function klok() : integer;  var  tmp : integer;  begin  if(i = 0) then  klok := i  else  begin  tmp := i;  klik();  klok := klok() + klek(tmp);  end;  end;  begin  A[1] := 1;  A[2] := 2;  A[3] := 3;  A[4] := 4;  A[5] := 5;  A[6] := 6;  A[10] := 11;  A[9] := 9;  A[7] := 8;  A[8]:=7;  read(n);  i := n;  writeln(klok());  end. |
| Kode Program Dimodifikasi : *(Hasil Modifikasi Diwarnai)* |
| const  MAXS = 10;  var  i, n : integer;  A : array[1..10] of integer;    procedure klik();  begin  i := i-1;  writeln('klik:i=',i,' ');  end;    function klek(x : integer) : integer;  begin  if(x = MAXS) then  klek := A[x] \* A[1]  else  klek := A[x] \* A[x+1];  write('klek:',klek,' ');  end;    function klok() : integer;  var  tmp : integer;  begin    if(i = 0) then  begin  klok := i;  writeln('Rekrusif Balik : ');  write('klok:',klok,' + ');  end  else  begin  tmp := i;  write('klok:tmp=',tmp,' ');  klik();  writeln;  klok := klok() + klek(tmp);  write('= klok:',klok,' + ');  end;  end;  begin  A[1] := 1;  A[2] := 2;  A[3] := 3;  A[4] := 4;  A[5] := 5;  A[6] := 6;  A[10] := 11;  A[9] := 9;  A[7] := 8;  A[8]:=7;    writeln('Isi Array A : ');  for i:=1 to 10 do  write(A[i],' ');    writeln;  writeln;    n:=6;  i := n;  klok();  //writeln(klok());  end. |
| Output Dari Kode Program Yang Dimodifikasi : |
| Isi Array A :  1 2 3 4 5 6 8 7 9 11  klok:tmp=6 klik:i=5  klok:tmp=5 klik:i=4  klok:tmp=4 klik:i=3  klok:tmp=3 klik:i=2  klok:tmp=2 klik:i=1  klok:tmp=1 klik:i=0  Rekrusif Balik :  klok:0 + klek:2 = klok:2 + klek:6 = klok:8 + klek:12 = klok:20 + klek:20 = klok:40 + klek:30 = klok:70 + klek:48 = klok:118 + |

1. No.27

|  |
| --- |
| Kode Program Dalam Soal : *(Soal Dirapikan)* |
| function Proses(x : integer) : integer;  begin  if(x <= 1) then  Proses := x  else  Proses := Proses(x div 2 \* x mod 2) + Proses(x div 2 + x mod 2);  end; |
| Kode Program Dimodifikasi : *(Hasil Modifikasi Diwarnai)* |
| var  is\_0,is\_1,is\_2,is\_3: boolean;    function Proses(x : integer) : integer;  var  hsl\_div : integer;  hsl\_mod : integer;  hsl\_kali : integer;  hsl\_tmbh : integer;  begin  if(x <= 1) then  begin  Proses := x;  if( (not is\_0) or (not is\_1) )then  begin  writeln('Proses(',x,')=',x);  if(not is\_0)then  is\_0:=x=0;  if(not is\_1)then  is\_1:=x=1;  end;    end  else  begin  hsl\_div := x div 2;  hsl\_mod := x mod 2;  hsl\_kali := hsl\_div\*hsl\_mod;  hsl\_tmbh := hsl\_div+hsl\_mod;  Proses := Proses(hsl\_kali) + Proses(hsl\_tmbh);  if(((not is\_2) or (not is\_3)) or (x>3)) then  begin  writeln('Proses(',x,')= Proses(',hsl\_kali,') + Proses(',hsl\_tmbh,') = ',proses);  if(not is\_2)then  is\_2:=x=2;  if(not is\_3)then  is\_3:=x=3;  end;  end;  end;  begin  is\_0:=false;  is\_1:=false;  is\_2:=false;  is\_3:=false;  Proses(11);  end. |
| Output Dari Kode Program Yang Dimodifikasi : |
| Proses(0)=0  Proses(1)=1  Proses(2)= Proses(0) + Proses(1) = 1  Proses(2)= Proses(0) + Proses(1) = 1  Proses(3)= Proses(1) + Proses(2) = 2  Proses(5)= Proses(2) + Proses(3) = 3  Proses(6)= Proses(0) + Proses(3) = 2  Proses(11)= Proses(5) + Proses(6) = 5 |

1. No. 29

|  |
| --- |
| Kode Program Dalam Soal : *(Soal Dirapikan)* |
| var  ar : array[1..10] of integer = (1,6,2,3,4,7,2,4,2,1);  procedure mantaps(n : integer);  var  i : integer;  iNi : integer;  temp : integer;  begin  if(n > 1) then  begin  iNi := n;    for i := 1 to n-1 do  begin  if(ar[i] < ar[iNi]) then  iNi := i;  end;    temp := ar[n];  ar[n] := ar[iNi];  ar[iNi] := temp;  mantaps(n-1);    end;    end; |
| Kode Program Dimodifikasi : *(Hasil Modifikasi Diwarnai)* |
| var  ar : array[1..10] of integer = (1,6,2,3,4,7,2,4,2,1);  procedure mantaps(n : integer);  var  i,j : integer;  iNi : integer;  temp : integer;  begin  if(n > 1) then  begin  iNi := n;  write(iNi,' ');    for i := 1 to n-1 do  begin  if(ar[i] < ar[iNi]) then  iNi := i;  end;    write(iNi,' ');    temp := ar[n];  ar[n] := ar[iNi];  ar[iNi] := temp;    for j:=1 to 10 do  write(ar[j],' ');    writeln;    mantaps(n-1);    end;    end;  var  i:integer;  begin  writeln('Isi ar sebelum mantaps : ');  for i:=1 to 10 do  write(ar[i],' ');  writeln;    writeln('Isi ar dalam mantaps : ');  writeln('ini ini ar ');  mantaps(5);  writeln;    writeln('Isi ar setelah mantaps : ');  for i:=1 to 10 do  write(ar[i],' ');  end. |
| Output Dari Kode Program Yang Dimodifikasi : |
| Isi ar sebelum mantaps :  1 6 2 3 4 7 2 4 2 1  Isi ar dalam mantaps :  ini ini ar  5 1 4 6 2 3 1 7 2 4 2 1  4 3 4 6 3 2 1 7 2 4 2 1  3 3 4 6 3 2 1 7 2 4 2 1  2 1 6 4 3 2 1 7 2 4 2 1  Isi ar setelah mantaps :  6 4 3 2 1 7 2 4 2 1 |

|  |  |
| --- | --- |
| Nama |  |
| NIM |  |
| OSP | 2015 |

1. No. 38

|  |
| --- |
| Kode Program Dalam Soal : *(Soal Dirapikan)* |
| var  a : array [1..100000] of longint;  i, j, n : longint;  begin  readln(n);  for i := 1 to n do  a[i] := 0;    for i := 2 to n do  begin  if (a[i] = 0) then  begin  j := i;  while (j <= n) do  begin  a[j] := a[j] + 1;  j := j + i;  end;  end;  end;  end. |
| Kode Program Dimodifikasi : *(Hasil Modifikasi Diwarnai)* |
| type  tarrstat = array[1..100,1..5,1..100] of longint;  tarr = array [1..100000] of longint;    procedure stat\_arr(n:integer;a:tarr;var stat:tarrstat);  var  i,j,k : integer;  begin  for i := 1 to n do  begin    if i<100 then  k:=1  else  if i<200 then  k:=2  else  if i<300 then  k:=3;    j:=1;  while(stat[a[i],k,j]<>0)do  j:=j+1;    stat[a[i],k,j]:=i;  end;  end;    procedure cetak\_stat\_arr(var stat:tarrstat);  var  i,j,k,jml : integer;  begin  for i := 1 to 4 do  begin  writeln('isi\_array ',i,': ');  writeln('index array : ');  for j:=1 to 5 do  begin  jml:=1;  for k:=1 to 100 do  begin  if (stat[i,j,k]>0) then  begin  write(stat[i,j,k]:4);  jml:=jml+1;  end;    if((jml>1)and ((jml mod 10)=0))then  begin  jml:=1;  writeln;  end;    end;  end;  writeln;  writeln;  end;  end;  var  a : tarr;  stat : tarrstat;  i, j, n : longint;  begin  n:=300;  for i := 1 to n do  a[i] := 0;    for i := 2 to n do  begin  if (a[i] = 0) then  begin  j := i;  while (j <= n) do  begin  a[j] := a[j] + 1;  j := j + i;  end;  end;  end;  stat\_arr(n,a,stat);  cetak\_stat\_arr(stat);  end. |
| Output Dari Kode Program Yang Dimodifikasi : |
| isi\_array 1:  index array :  2 3 4 5 7 8 9 11 13  16 17 19 23 25 27 29 31 32  37 41 43 47 49 53 59 61 64  67 71 73 79 81 83 89 97 101 103 107 109 113 121 125 127 128  131 137 139 149 151 157 163 167 169  173 179 181 191 193 197 199 211 223 227 229 233 239 241 243 251  256 257 263 269 271 277 281 283 289  293  isi\_array 2:  index array :  6 10 12 14 15 18 20 21 22  24 26 28 33 34 35 36 38 39  40 44 45 46 48 50 51 52 54  55 56 57 58 62 63 65 68 69  72 74 75 76 77 80 82 85 86  87 88 91 92 93 94 95 96 98  99 100 104 106 108 111 112 115 116 117  118 119 122 123 124 129 133 134 135  136 141 142 143 144 145 146 147 148  152 153 155 158 159 160 161 162 164  166 171 172 175 176 177 178 183 184  185 187 188 189 192 194 196 200 201 202 203 205 206 207 208 209  212 213 214 215 216 217 218 219 221  224 225 226 232 235 236 237 242 244  245 247 248 249 250 253 254 259 261  262 265 267 268 272 274 275 278 279  284 287 288 291 292 295 296 297 298  299  isi\_array 3:  index array :  30 42 60 66 70 78 84 90 102 105 110 114 120 126 130 132 138  140 150 154 156 165 168 170 174 180  182 186 190 195 198 204 220 222 228 230 231 234 238 240  246 252 255 258 260 264 266 270 273  276 280 282 285 286 290 294 300  isi\_array 4:  index array :  210 |

|  |  |
| --- | --- |
| Nama |  |
| NIM |  |
| OSP | 2014 |

1. No. 48

|  |
| --- |
| Kode Program Dalam Soal : *(Soal Dirapikan)* |
| var  data1 : array[1..10] of integer = (4,11,2,5,1,9,7,5,6,8);  data2,data3 : array[1..10] of integer;  i : integer;  begin  for i:= 1 to 10 do  data2[i] := 1;    for i:= 1 to 10 do  inc(data2[data1[i]]);    for i:= 2 to 10 do  data2[i] := data2[i] + data2[i-1];  for i:= 10 downto 1 do  begin  data3[data2[data1[i]]] := data1[i];  dec(data2[data1[i]]);  end;    for i:= 1 to 10 do  write(data3[i]);  end. |
| Kode Program Dimodifikasi : *(Hasil Modifikasi Diwarnai)* |
| var  data1 : array[1..10] of integer = (4,10,2,5,1,9,7,5,6,8);  data2,data3 : array[1..10] of integer;  i : integer;  begin  writeln('Isi Data2 :');  for i:= 1 to 10 do  begin  data2[i] := 1;  write(data2[i],' ; ');  end;  writeln;  writeln;  writeln('i':2,'data1':7,'data2':7);  for i:= 1 to 10 do  begin  inc(data2[data1[i]]);  writeln(i:2,data1[i]:7,data2[data1[i]]:7);  end;  writeln;  writeln;  writeln('i ':2,'data2[i]+data2[i-1]':7,'data2[i]':7);  for i:= 2 to 10 do  begin  write(i:2,data2[i]:7,data2[i-1]:7);  data2[i] := data2[i] + data2[i-1];  writeln(data2[i]:7);  end;  writeln;  writeln('i ':2,' data1':7,' data2':7,' data3':7,' dec(data2)':7);  for i:= 10 downto 1 do  begin  data3[data2[data1[i]]] := data1[i];  write(i:2,data1[i]:7,data2[data1[i]]:7,data3[data2[data1[i]]]:7);  dec(data2[data1[i]]);  writeln(data2[data1[i]]:10);  end;    writeln('Isi Data3 :');  for i:= 1 to 30 do  writeln(i:2,data3[i]:7);  end. |
| Output Dari Kode Program Yang Dimodifikasi : |
| Isi Data2 :  1 ; 1 ; 1 ; 1 ; 1 ; 1 ; 1 ; 1 ; 1 ; 1 ;  i data1 data2  1 4 2  2 10 2  3 2 2  4 5 2  5 1 2  6 9 2  7 7 2  8 5 3  9 6 2  10 8 2  i data2[i]+data2[i-1] =data2[i]  2 2 2 4  3 1 4 5  4 2 5 7  5 3 7 10  6 2 10 12  7 2 12 14  8 2 14 16  9 2 16 18  10 2 18 20  i data1 data2 data3 dec(data2)  10 8 16 8 15  9 6 12 6 11  8 5 10 5 9  7 7 14 7 13  6 9 18 9 17  5 1 2 1 1  4 5 9 5 8  3 2 4 2 3  2 10 20 10 19  1 4 7 4 6  Isi Data3 :  1 0  2 1  3 0  4 2  5 0  6 0  7 4  8 0  9 5  10 5  11 0  12 6  13 0  14 7  15 0  16 8  17 0  18 9  19 0  20 10  21 0  22 0  23 0  24 0  25 0  26 0  27 0  28 0  29 0  30 0 |

1. No. 26

|  |
| --- |
| Kode Program Dalam Soal : *(Soal Dirapikan)* |
| var  i, j, total : integer;  begin  total := 0;  for i := 1 to 100 do  for j := 1 to 100 do  total := total + i - j;  writeln(total);  end. |
| Kode Program Dimodifikasi : *(Hasil Modifikasi Diwarnai)* |
| var  i, j, total : integer;  begin  total := 0;  writeln('i':4,'j':4,'i-j':7,'total':7);  for i := 1 to 100 do  for j := 1 to 100 do  begin  total := total + i - j;  if( ((i=1) and (j<=10)) or ((i=100) and (j>90)) )then  writeln(i:4,j:4,(i-j):7,total:7);    end;  //writeln(total);  end. |
| Output Dari Kode Program Yang Dimodifikasi : |
| i j i-j total  1 1 0 0  1 2 -1 -1  1 3 -2 -3  1 4 -3 -6  1 5 -4 -10  1 6 -5 -15  1 7 -6 -21  1 8 -7 -28  1 9 -8 -36  1 10 -9 -45  100 91 9 -36  100 92 8 -28  100 93 7 -21  100 94 6 -15  100 95 5 -10  100 96 4 -6  100 97 3 -3  100 98 2 -1  100 99 1 0  100 100 0 0 |

|  |  |
| --- | --- |
| Nama |  |
| NIM |  |
| OSP | 2013 |

1. No. 26

|  |
| --- |
| Kode Program Dalam Soal : *(Soal Dirapikan)* |
| var N,hasil: integer;    procedure solve(X:integer);  begin  if (X>1) then  begin  hasil:=hasil+1;  solve(X div 2 + X mod 2);  end;  end;  begin  readln(N);  hasil:=0;  solve(N);  writeln(hasil);  end. |
| Kode Program Dimodifikasi : *(Hasil Modifikasi Diwarnai)* |
| var N,hasil: integer;    procedure solve(X:integer);  begin  if (X>1) then  begin  hasil:=hasil+1;  writeln(hasil:7,x:7,(x div 2):7,(x mod 2):7,((x div 2)+(x mod 2)):7);  solve(X div 2 + X mod 2);  end;  end;  begin  N:=77;  hasil:=0;  writeln('hasil':7,'x':7,'div':7,'mod':7,'div+mod':10);  solve(N);  //writeln(hasil);  end. |
| Output Dari Kode Program Yang Dimodifikasi : |
| hasil x div mod div+mod  1 77 38 1 39  2 39 19 1 20  3 20 10 0 10  4 10 5 0 5  5 5 2 1 3  6 3 1 1 2  7 2 1 0 1 |

1. No. 27

|  |
| --- |
| Kode Program Dalam Soal : *(Soal Dirapikan)* |
| base := ‘QWERTYUIOPLKJHGFDSAZXCVBNM’;  kata := ‘’;  readln(kalimat);  for i:= length(kalimat) downto 1 do  begin  if pos(kalimat[i], base) > 0 then  kata:= kata & kalimat[i];  end;  writeln(kata); |
| Kode Program Dimodifikasi : *(Hasil Modifikasi Diwarnai)* |
| var  base,kata,kalimat : string;  i : integer;  begin  base := 'QWERTYUIOPLKJHGFDSAZXCVBNM';  kata := '';  kalimat:='s4yA-BuK4N+oRanG aLaY!?';  for i:= length(kalimat) downto 1 do  begin  if pos(kalimat[i], base) > 0 then  begin  writeln(kalimat[i]);  kata:= kata & kalimat[i];  end;  end;  //writeln(kata);  end. |
| Output Dari Kode Program Yang Dimodifikasi : |
| Y  L  G  R  N  K  B  A |

1. No. 29

|  |
| --- |
| Kode Program Dalam Soal : *(Soal Dirapikan)* |
| var  we: longint;  Z: array[1..15] of longint = (64, 19, 56, 67, 66, 82,31, 20, 67, 10, 94, 100, 57, 14, 86);  function f(x: longint; y: longint): longint;  var  a, b: longint;  begin  if (x = y) then  f := Z[y]  else  begin  a := f(x, (x+y) div 2);  b := f((x+y) div 2+1, y);  if (a < b) then  f := a  else  f := b  end  end;  begin  we := f(3,11);  writeln(we);  end. |
| Kode Program Dimodifikasi : *(Hasil Modifikasi Diwarnai)* |
| var  we: longint;  Z: array[1..15] of longint = (64, 19, 56, 67, 66, 82,31, 20, 67, 10, 94, 100, 57, 14, 86);  function f(x: longint; y: longint): longint;  var  a, b,tmp\_x,tmp\_y: longint;  begin  if (x = y) then  begin  f := Z[y];  writeln('f(',x,',',y,')=',f);  end  else  begin  tmp\_y:= (x+y) div 2;  tmp\_x:= ((x+y) div 2)+1;  a := f(x, tmp\_y);  b := f(tmp\_x, y);  if (a < b) then  f := a  else  f := b;  writeln(' f(',x,',',y,')=min(f(',x,',',tmp\_y,'),f(',tmp\_x,',',y,'))=',f);  end;    end;  begin  we := f(3,11);  //writeln(we);  end. |
| Output Dari Kode Program Yang Dimodifikasi : |
| f(3,3)=56  f(4,4)=67  f(3,4)=min(f(3,3),f(4,4))=56  f(5,5)=66  f(3,5)=min(f(3,4),f(5,5))=56  f(6,6)=82  f(7,7)=31  f(6,7)=min(f(6,6),f(7,7))=31  f(3,7)=min(f(3,5),f(6,7))=31  f(8,8)=20  f(9,9)=67  f(8,9)=min(f(8,8),f(9,9))=20  f(10,10)=10  f(11,11)=94  f(10,11)=min(f(10,10),f(11,11))=10  f(8,11)=min(f(8,9),f(10,11))=10  f(3,11)=min(f(3,7),f(8,11))=10 |

|  |  |
| --- | --- |
| Nama |  |
| NIM |  |
| OSP | 2012 |

1. No. 26

|  |
| --- |
| Kode Program Dalam Soal : *(Soal Dirapikan)* |
| function F1(i, j : integer) : integer;  begin  if (i < 0) or (j < 0) then  F1 := max(i, j) + 1  else  if i = j then  F1 := F1(i + 1, j - 1)  else  F1 := F1(i - 2, j - 1) + F1(i - 1, j - 2);  end; |
| Kode Program Dimodifikasi : *(Hasil Modifikasi Diwarnai)* |
| uses crt,math;  function F1(i, j : integer) : integer;  begin  if (i < 0) or (j < 0) then  begin  F1 := max(i, j) + 1;  writeln('F1(',i,',',j,')=',F1);  end  else  if i = j then  begin  F1 := F1(i + 1, j - 1);  //writeln(' F1(',i + 1,',',j - 1,')=',F1);  end  else  begin    F1 := F1(i - 2, j - 1) + F1(i - 1, j - 2);  writeln(' F1(',i,',',j,')=F1(',i-2,',',j-1,')+F1(',i-1,',',j-2,')=',F1);  end;  end;  begin  F1(4,3);  end. |
| Output Dari Kode Program Yang Dimodifikasi : |
| F1(-1,-1)=0  F1(0,-2)=1  F1(1,0)=F1(-1,-1)+F1(0,-2)=1  F1(2,-1)=3  F1(3,1)=F1(1,0)+F1(2,-1)=4  F1(-1,-1)=0  F1(0,-2)=1  F1(1,0)=F1(-1,-1)+F1(0,-2)=1  F1(2,-1)=3  F1(3,1)=F1(1,0)+F1(2,-1)=4  F1(4,3)=F1(2,2)+F1(3,1)=8 |