

■ Θέμα 1

In[1]:= `f[n_Integer] := If[Mod[n, 2] == 0, $\frac{n}{2}$, $\frac{n-1}{2}$]`

In[2]:= `f[3]`

Out[2]= 1

In[3]:= `f[4]`

Out[3]= 2

In[4]:= `g[n_Integer] := Module[{s = {}, n1 = n},
 While[n1 > 0,
 s = Prepend[s, {Mod[n1, 2]}]; n1 = f[n1]];
 s
]`

In[6]:= `g[14]`

Out[6]= $\begin{pmatrix} 1 \\ 1 \\ 1 \\ 0 \end{pmatrix}$

■ Θέμα 2

A)

In[34]:= `g[x_, y_] :=
 Switch[{x, y}, {0, 0}, 0, {0, 1}, 1, {0, 2}, 2, {1, 0},
 1, {1, 1}, 2, {1, 2}, 0, {2, 0}, 2, {2, 1}, 0, {2, 2}, 1]`

B)

```
In[35]:= f[x_, y_] :=  
    Switch[{x, y}, {0, 0}, 0, {0, 1}, 0, {0, 2}, 0, {1, 0},  
    0, {1, 1}, 1, {1, 2}, 2, {2, 0}, 0, {2, 1}, 2, {2, 2}, 1]
```

C)

```
In[36]:= Inner[g, {{1, 2}, {1, 0}}, {{2, 1}, {0, 2}}, f]
```

```
Out[36]=  $\begin{pmatrix} 0 & 2 \\ 0 & 1 \end{pmatrix}$ 
```

■ Θέμα 3

A)

```
In[37]:= a = Table[i, {i, 1, 10}]
```

```
Out[37]= {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
```

```
In[38]:= Apply[Plus, a]
```

```
Out[38]= 55
```

B)

```
In[39]:= i = 1;  
While[2Prime[i] ≤ 100, ++i];  
i - 1
```

```
Out[41]= 3
```

■ Θέμα 4

In[42]:= **a1 = Range [100]**

Out[42]= {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100}

In[43]:= **a2 = Drop [a1, {2, Length[a1], 3}]**

Out[43]= {1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, 54, 55, 57, 58, 60, 61, 63, 64, 66, 67, 69, 70, 72, 73, 75, 76, 78, 79, 81, 82, 84, 85, 87, 88, 90, 91, 93, 94, 96, 97, 99, 100}

In[44]:= **a3 = Reverse [a2]**

Out[44]= {100, 99, 97, 96, 94, 93, 91, 90, 88, 87, 85, 84, 82, 81, 79, 78, 76, 75, 73, 72, 70, 69, 67, 66, 64, 63, 61, 60, 58, 57, 55, 54, 52, 51, 49, 48, 46, 45, 43, 42, 40, 39, 37, 36, 34, 33, 31, 30, 28, 27, 25, 24, 22, 21, 19, 18, 16, 15, 13, 12, 10, 9, 7, 6, 4, 3, 1}

In[46]:= **a4 = Drop [a3, {2, Length[a3], 3}]**

Out[46]= {100, 97, 96, 93, 91, 88, 87, 84, 82, 79, 78, 75, 73, 70, 69, 66, 64, 61, 60, 57, 55, 52, 51, 48, 46, 43, 42, 39, 37, 34, 33, 30, 28, 25, 24, 21, 19, 16, 15, 12, 10, 7, 6, 3, 1}

In[47]:= **a5 = Reverse [a4]**

Out[47]= {1, 3, 6, 7, 10, 12, 15, 16, 19, 21, 24, 25, 28, 30, 33, 34, 37, 39, 42, 43, 46, 48, 51, 52, 55, 57, 60, 61, 64, 66, 69, 70, 73, 75, 78, 79, 82, 84, 87, 88, 91, 93, 96, 97, 100}

In[48]:= **a6 = Drop [a5, {2, Length[a5], 3}]**

Out[48]= {1, 6, 7, 12, 15, 19, 21, 25, 28, 33, 34, 39, 42, 46, 48, 52, 55, 60, 61, 66, 69, 73, 75, 79, 82, 87, 88, 93, 96, 100}

In[49]:= **a7 = Reverse [a6]**

Out[49]= {100, 96, 93, 88, 87, 82, 79, 75, 73, 69, 66, 61, 60, 55, 52, 48, 46, 42, 39, 34, 33, 28, 25, 21, 19, 15, 12, 7, 6, 1}

```
In[50]:= a8 = Drop[a7, {2, Length[a7], 3}]
```

```
Out[50]= {100, 93, 88, 82, 79, 73, 69, 61, 60, 52, 48, 42, 39, 33, 28, 21, 19, 12, 7, 1}
```

```
In[51]:= a9 = Reverse[a8]
```

```
Out[51]= {1, 7, 12, 19, 21, 28, 33, 39, 42, 48, 52, 60, 61, 69, 73, 79, 82, 88, 93, 100}
```

```
In[52]:= a10 = Drop[a9, {2, Length[a9], 3}]
```

```
Out[52]= {1, 12, 19, 28, 33, 42, 48, 60, 61, 73, 79, 88, 93}
```

```
In[53]:= a11 = Reverse[a10]
```

```
Out[53]= {93, 88, 79, 73, 61, 60, 48, 42, 33, 28, 19, 12, 1}
```

```
In[54]:= a12 = Drop[a11, {2, Length[a11], 3}]
```

```
Out[54]= {93, 79, 73, 60, 48, 33, 28, 12, 1}
```

```
In[55]:= a13 = Reverse[a12]
```

```
Out[55]= {1, 12, 28, 33, 48, 60, 73, 79, 93}
```

```
In[56]:= a14 = Drop[a13, {2, Length[a13], 3}]
```

```
Out[56]= {1, 28, 33, 60, 73, 93}
```

```
In[57]:= a15 = Reverse[a14]
```

```
Out[57]= {93, 73, 60, 33, 28, 1}
```

```
In[58]:= a16 = Drop[a15, {2, Length[a15], 3}]
```

```
Out[58]= {93, 60, 33, 1}
```

```
In[59]:= a17 = Reverse[a16]
```

```
Out[59]= {1, 33, 60, 93}
```

```
In[60]:= a18 = Drop[a17, {2, Length[a17], 3}]
```

```
Out[60]= {1, 60, 93}
```

```
In[61]:= a19 = Reverse[a18]
```

```
Out[61]= {93, 60, 1}
```

```
In[62]:= a20 = Drop[a19, {2, Length[a19], 3}]
```

```
Out[62]= {93, 1}
```

```
In[63]:= a21 = Reverse[a20]
```

```
Out[63]= {1, 93}
```

■ Πολύ πιο απλά :

```
In[64]:= a = Range[100];
```

```
While[Length[a] ≠ 2,
```

```
  a = Drop[a, {2, Length[a], 3}]; a = Reverse[a]; a
```

```
Out[65]= {1, 93}
```

```
In[66]:= f[n_Integer] := Module[{a = Range[n]},
```

```
  While[Length[a] ≠ 2,
```

```
    a = Drop[a, {2, Length[a], 3}]; a = Reverse[a];
```

```
  a]
```

```
In[67]:= f[100]
```

```
Out[67]= {1, 93}
```

```
In[68]:= f[200]
```

```
Out[68]= {181, 79}
```

■ Θέμα 5

```
In[70]:= Do[If[PrimeQ[i] && PrimeQ[i + 2],  
Print["(", i, ", ", i + 2, ")"]], {i, 1, 100}]
```

```
(3,5)
```

```
(5,7)
```

```
(11,13)
```

```
(17,19)
```

```
(29,31)
```

```
(41,43)
```

```
(59,61)
```

```
(71,73)
```

```
In[72]:= Do[If[Prime[i + 1] - Prime[i] == 2,  
    Print["(", Prime[i], ", ", Prime[i + 1], ")"],  
    {i, 1, PrimePi[100]}]
```

(3,5)

(5,7)

(11,13)

(17,19)

(29,31)

(41,43)

(59,61)

(71,73)