Paper Computer – Answer Key & Sample Programs

Use this as a companion to the workshop worksheet: two sample programs + an answer key explaining each step + a filled-in worksheet example.

Sample Program 1: Add Two Numbers (Input A → Sum → Output A)

What it does: You enter two whole numbers (A and B). The computer adds them and prints “SUM IS” and the result.

Demo inputs: A = 7, B = 5 → output should be 12.

SS	Instruction / Data
00	`ENIA, 95   ; enter A`
01	`ENIA, 96   ; enter B`
02	`LDRA, 95   ; A → Register A`
03	`ADDA, 96   ; Register A = A + B`
04	`STRA, 99   ; store result`
05	`PROA, 10   ; print label`
06	`PROA, 99   ; print result`
07	`STOP, 07   ; stop`
10	`SUM IS     ; text`

Answer Key (Program 1)

• 00–01: Enter A and B using Input A; store them in memory (95 and 96).

• 02: Load A into Register A.

• 03: Add B (from 96) to Register A.

• 04: Store the sum into 99 (so it can be printed).

• 05–06: Print the label then the number on Output A.

• 07: Stop.

Expected Output A (example)

```
SUM IS
12
```

Sample Program 2: Jump Switch Greeting (IF Jump Switch A = 1)

What it does: If Jump Switch A is set to 1, it prints “HELLO”. Otherwise it prints “HI”.

Why it’s great: It demonstrates configuration flags and branching (the origin of *if/else*).

SS	Instruction / Data
00	`JJA1, 04   ; if Jump Switch A == 1, jump to 04`
01	`PROA, 10   ; print HI`
02	`STOP, 02   ; stop`
04	`PROA, 11   ; print HELLO`
05	`STOP, 05   ; stop`
10	`HI         ; text`
11	`HELLO      ; text`

Answer Key (Program 2)

• Set Jump Switch A before you start: A=0 prints HI; A=1 prints HELLO.

• 00: The jump instruction checks Jump Switch A. If it’s 1, the Program Step Indicator becomes 04.

• 01–02: If A was 0, the program falls through and prints HI, then stops.

• 04–05: If A was 1, the computer jumps to 04, prints HELLO, then stops.

Expected Output A

```
HI (if A=0)
HELLO (if A=1)
```

Filled Worksheet Example (matches Sample Program 1)

Goal: Add two numbers and print the sum.

Inputs: Two numbers from Input A (A and B).

Line	Write this on the worksheet
00	`ENIA, 95  (Enter A)`
01	`ENIA, 96  (Enter B)`
02	`LDRA, 95`
03	`ADDA, 96`
04	`STRA, 99`
05	`PROA, 10  (SUM IS)`
06	`PROA, 99  (result)`
STOP	`STOP, 07`
Data	`10 = SUM IS`

Quick facilitation tip: Ask participants to predict the value in Register A after step 03, then check it together.