# Worksheet 3 Types of processor

**Task 1**

1. Using standard von Neumann architecture, instructions and data both share the same memory space.

|  |  |
| --- | --- |
| **Memory** | |
| **Address** | **Instruction / Data** |
| 0 | 10010111 00101111 |
| 1 |  |
| 2 | 00000000 11010100 |
| … | … |
| 255 | 00000000 01001010 |

One problem with this model is that the CPU can either be reading an instruction or reading/writing data to or from memory, but not both at the same time since instructions and data use the same bus system, which is a performance limitation.

1. Name another architecture that resolves this issue. How does it differ from von Neumann architecture?

Another architecture that resolves this issue is Harvard. This is because when Harvard is used, information and data are classified in seoerate areas, due to this, they both can be individually separated which resolves Von Neumann.

(b) What other advantages are there of using this architecture?

Another advantage of using this architecture is that there are even separate buses for data and instructions, therefore the separate conent is carried in different area which makes it easier to understand the process .

# (c) What are the advantages of von Neumann architecture over Harvard architecture?

An advantage of von Neumann architecture over Harvard architecture is that it has two forms of registers, General purpose register and Specific purpose register, therefore each of components of the registers are assigned to specific roles in the system.

2. Complete the following text by using the words an phrases given below to fill in the gaps.

CISC stands for Complete instruction set computer . In this technology, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ consists of a \_\_\_\_\_\_\_\_small\_\_\_\_\_\_\_\_ number of instructions, each designed to execute a series of \_\_\_\_\_\_\_\_\_sub-tasks\_\_\_\_\_\_\_ that make up a single \_\_\_\_\_\_\_\_\_\_instruction set. Because the code is relatively \_\_\_\_\_\_\_large\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_RAM is needed to store the instructions.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ stands for Reduced Instruction Set Computer. This type of computer uses a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ instruction set, and each instruction can be performed in one \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This means that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is possible, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is at least as good or better than CISC.

Cheap \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ has contributed to the prevalence of this technology in almost all modern desktop computers.

pipelining short large clock cycle performance very little sub-tasks instruction instruction set Complex Instruction Set Computer small RAM RISC

**Task 2**

Compare co-processor and parallel processor systems. (Note that “compare” means describe similarities and differences.)