# Episode - 2
# Computer technology in India

Hasan Jawaid Khan

**Characters**

**Asha** Female teacher
**Jigyasa** Female Student

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| *Sound of falling rain…* | |
| Jigyasa (*muttering under her breath and in desperation*) | Oh…Oh…why did the rain have to start right now? …completely spoilt my hair…how am I going to reach my friend's house now. Oh no! It has started pouring now! Let me run into this departmental store…(*sound of running footsteps*) |
| Jigyasa (*startled as she finds her teacher also there)* | …Oh, hello ma'am! It's so nice to see you here! You also got wet? |
| Asha | No, I stopped here as soon as the first drops of rain started falling. Where are you going, your home is not this way? |
| Jigyasa | No ma'am, I was going to Rupali's house and there we are all going to meet…but I am already late…they must be having such fun… |
| Asha | It's okay, now don't get so frustrated…looking at the manner it is pouring I don't think you will be able to move out before half an hour. Come let's go inside…we will have some coffee…enjoy the rain, dear… |
| Jigyasa (*resignedly*) | Okay ma'am, let's go…I guess there is nothing much I can do. |
| Asha | Come…sit…what will you have…tea or coffee? I will have a hot cup of coffee…suits the occasion. |
| Jigyasa | I will also take a coffee. |
| Asha (*addressing the waiter*) | Two cups of coffee please. |
| Jigyasa | Ma'am, in today's newspaper the met department had reported that there could be heavy rain in the evening…and look at the way it's |

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| | raining…how can they tell with such accuracy that it's going to rain, say, 24 hours from now? |
| Asha | Well, the met departments keep on getting data from the hundreds of observation stations that they have set up throughout the country, and also from ocean buoys and weather satellites. So, there is a huge amount of data that keeps trickling in throughout the day. |
| Jigyasa | No, but how are they able to make such fast calculations? You say that the data trickling in huge…so how are they able to analyse all that data and predict the weather, say a few hours from now? |
| Asha | Well, the met departments now have supercomputers to do all their calculations. And supercomputers are becoming faster and faster with every passing day. They are able to process mounds of information in a jiffy. |
| Jigyasa | So, in India also do the met departments have supercomputers? |
| Asha | Certainly. |
| Jigyasa | Made in India? |
| Asha | Of course! India is now one of the frontrunners in the field of supercomputers. |
| Jigyasa | But I have heard of only Cray supercomputers of America. |
| Asha | Well, Cray is a very old model now. There was a time long back when it was considered to be the most advanced supercomputer. |
| Jigyasa | Did India have its own supercomputers then? |
| Asha | No, and in 1985 we had to ask the Americans to let us import their Cray supercomputer. Those times only US and Japan had the supercomputing technology. |
| Jigyasa | But why did we need the supercomputer so badly? |
| Asha | Well, perhaps you know that the Indian economy has for long been dependent on agriculture. And, in the past, because of poor mechanisms of weather forecasting the nation had to suffer severe droughts and famines. |

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| Jigyasa | Okay, so we needed the Cray supercomputer so that we could forecast the weather patterns correctly and in this way save our crops. |
| Asha | Right, but the Americans initially denied to gives us the supercomputer. |
| Jigyasa | Why…India must have been ready to pay for it? |
| Asha | Well, it was denied because supercomputing is a 'dual-use technology', meaning that it could be used by India in its Nuclear, Space and Defence programs. |
| Jigyasa | Oh, so they were afraid that we would take the Cray supercomputer on the pretext of using it for weather forecasting and research and use it instead for nuclear and defence purposes. |
| Asha | Right. It was only after several meetings and negotiations over two years and after India's then Prime Minister Rajiv Gandhi met US President Ronald Reagan that the issue was resolved. |
| Jigyasa | Okay, so then we got the Cray supercomputer? |
| Asha | Yes, we did get it but not the model that we wanted… The India Meteorological Department had to settle for an old model…the Cray XMP-14. |
| Jigyasa | That's so humiliating! What a shame! |
| Asha | Indeed it is. And when the Indian Institute of Science in Bangalore asked for a supercomputer, the US government refused plainly. |
| Jigyasa | That must have been such a great setback for Indian scientists, isn't it? Without a supercomputer they would not have been able to do huge calculations fast. So… then what did India do? |
| Asha | Well, Indian scientists were both angry as well as depressed. But, Prime Minister Rajiv Gandhi challenged and motivated them to come up with their own supercomputers of international standards so that the country does not have to go begging before others. |
| Jigyasa | Yes…that's the way to go! But did our scientists manage to develop |

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| | supercomputers of their own? |
| Asha | Yes, they did. Among the first to come out with one, called Flosolver, in 1986 was the Bangalore based National Aerospace Laboratories or NAL, which is a laboratory of the Council of Scientific & Industrial Research or CSIR. In fact, when the Indian Institute of Science was denied the supercomputer by the US, they went in for the Flosolver. |
| Jigyasa | That's great. But was this supercomputer comparable to the US supercomputer? |
| Asha | Well, it was only half as powerful as the Cray XMP machine but it cost only a tenth of the cost of the Cray. |
| Jigyasa | Well, that was a good beginning indeed. At least we had something. |
| Asha | Yes, but the later developments were more exciting.<br>*(Just then Jigyasa's phone rings)* |
| Jigyasa | Excuse me ma'am… *(on the phone)* …yaar, I got caught in the rain near the Departmental Store. And you know what…Asha ma'am was also there, we are both having coffee now…*(in a whisper)* …not bored at all…*(loudly)*…in fact, she is telling me an exciting story of how India developed its own supercomputer from scratch…never mind…I will wait here until the rain stops. Okay bye. (*Talking to Ma'am)* …sorry ma'am, my friends were worried about me. You were going to tell about something exciting, ma'am. |
| Asha | Well, the Flosolver was just the beginning. In 1988, the Centre for Advanced Computing or C-DAC was launched as India's national initiative in supercomputing. And barely three years later, in 1991, C-DAC came up with the PARAM 8000 supercomputer. PARAM became India's answer to US denial. You know, the *Wall Street Journal*, the world famous business and finance newspaper published from the US splashed on its front-page headline: 'Angry India does IT'. |
| Jigyasa | Wow!! Now that is known as a befitting reply! Oh, what a great |

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| | feeling it must have been for the scientists who worked on developing the PARAM supercomputer! |
| **At this stage we may introduce a byte from Dr Vijay Bhatkar talking about the excitement of creating world-class supercomputers after being denied technology.** | |
| Asha | Of course, it was a proud feeling. And you know, our scientists were not content with this. They kept on increasing the computing ability of the PARAM machines—the earliest PARAM 8000 was upgraded to PARAM 8600, then PARAM 9000. You will not believe, India even started receiving export orders and more than thirty of these machines were sold, including four to countries like Russia, Canada and Germany. |
| Jigyasa | Wow…that is so exciting…we started with literally begging for supercomputers from the West and went on to a stage when our own indigenously developed supercomputers began to be sold in the international market. |
| Asha | Yes, and competing with the best on offer but still keeping the price low. That was a great achievement. And then in 1998 C-DAC came up with PARAM 10000 that could perform 100 billion calculations in a second. It became India's most powerful and Asia's second most powerful supercomputer. |
| Jigyasa | It is getting more and more exciting! |
| Asha | Yes, India became the world's third country to possess this strategic technology, following US and Japan. And until sometime back EKA, the supercomputer developed by the Computational Research Laboratories in Pune, was ranked as the fourth fastest supercomputer in the world and the fastest in Asia. It was ranked next only to USA's IBM systems. |
| Jigyasa | Wow…what a great achievement! But tell me ma'am, are we only exporting all these supercomputers or are we using them in India as well? |

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| Asha | Of course, the supercomputers being developed here are contributing immensely to the country's development. These supercomputers have been provided to several academic institutions including the Indian Institutes of Technology, regional engineering colleges and research institutions. For instance, the Indian Institute of Science inducted PARAM 10000 into its educational research and development activities. |
| Jigyasa | Okay…so supercomputers are being used for educational purposes. |
| Asha | No, there are many areas that can benefit from supercomputing, such as biotechnology, semiconductor electronics, superconductivity, design of advanced materials, high energy physics, radio astronomy, earth sciences, oil exploration and nuclear power simulations. |
| Jigyasa | Oh…that is a big list… |
| Asha | Yes, supercomputers find applications in defence, space and oceanographic research, drug and aircraft designing, remote sensing, and today even in telemedicine. Several premier medical institutions in the country have been linked through supercomputers to provide high-quality medical advice including visual access and even surgery through the network. |
| Jigyasa | Oh…yes… I have read about telemedicine, how patients can get the best medical advice from doctors sitting in distant hospitals …and, of course, you said supercomputers are also being used for weather forecasting. |
| Asha | Yes, these powerful supercomputers have made weather predictions much better than before. C-Dac's latest PARAM Yuva supercomputer can calculate one lakh crore calculations per second. |
| Jigyasa | One lakh crore calculations in one second! |
| Asha | Yes…now C-Dac is designing and developing a supercomputer that can perform 100 lakh crore mathematical calculations in a second! |

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| Jigyasa | Whoosh!! |
| Asha | At present only America has developed such an advanced super speed computer. Our supercomputer will be ready by 2012. |
| Jigyasa | Wow! I am surely going to tell all my friends about this. It is something to be really proud of. |
| Asha | Indeed. |
| Jigyasa | I have been reading about India's success story in the software sector, how Indian software engineers are so sought after. But I did not know that Indian scientists have created such great success in the field of supercomputers. |
| Asha | Well, India's success in the field of Information and Communications Technology, what is popularly called ICT, is really commendable. Did you know that in ICT India is reaching US $120 Billion and grew at 15% plus in 2009-10 in spite of worldwide recession, compared to low single digit growth in the US? |
| Jigyasa | Yes, and I have also read that most of US Fortune 500 companies are driven by India's software and services. |
| Asha | And to top it all, India's Infosys, TCS, and HCLs have started acquiring US and European companies. You know, Bill Gates had warned the USA government few years back that very soon India would eat American lunch! |
| Jigyasa | He was so correct! So many jobs from the US have already been outsourced to India and it has become such a great issue there. |
| Asha | Yes, in fact, Bangalore is today recognised as the world's IT capital much on the lines of Silicon Valley. And do you know the word 'bangalored' has entered the Webster dictionary. It refers to people who have been laid off from a multinational because their job has been moved to India. |
| Jigyasa | That's funny! |
| Asha | Oh, by the way, it is only drizzling now. (*Looks at her watch and* |

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| | *exclaims)…*Oh…Oh…we have spent so much time here talking. I must rush, I am expecting guests at home. |
| Jigyasa | Yes, ma'am, I will also rush to my friend's house. But the supercomputer story has filled me with me so much pride. I think you must tell the whole class this story. |
| Asha | Good idea, will do so definitely. OK…bye then… |
| Jigyasa | Bye ma'am. |

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