



# **Effects of Using IT**

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## **Microprocessor-Controlled Devices**



# What is a microprocessor?

- A microprocessor is an integrated circuit (IC) that contains a central processing unit (CPU)
- The microprocessor is responsible for **executing instructions**

## Data security issues

- Any device fitted with a microprocessor is open to cybercriminal activity
- Microprocessor controlled devices give hackers more opportunities, for example:
  - Hacking smart home systems to control security devices such as cameras and locks
  - Hacking smart controlled heating systems to monitor patterns of when heating is on and off, data which can be used to track when people are at home or not

# **Monitoring & Controlling Devices**

- Microprocessors are used in a home to monitor and control devices such as:
  - Central heating systems
  - Security alarm systems
  - Home entertainment system etc.
- The use of microprocessors in the home can have a positive and negative impact on:
  - Lifestyle
  - Leisure
  - Physical fitness

# Advantages and disadvantages of monitoring and controlling devices

Lifestyle	Leisure	Physical fitness
Less manual tasks	More time to do other things	Loss of fitness due to lack of manual tasks
Devices can be controlled outside of the home (e.g. turn on the heating on the way home)	Connected activities (e.g. fitness trackers can connect with friends for virtual competition	People become lazy as they depend on devices
Live security alerts sent straight to a smartphone or	Integrated entertainment (e.g. Smart TV offer voice control	Unrealistic expectations (e.g. comparing a users



computer	and personalisation)	progress to others data)
Less manual tasks can lead to unhealthy lifestyle	Users can become tech dependant and put limits on creativity	Biometric data not always accurate



### **Social interactions**

- The use of smart devices such as tablets, TVs and phones allows for better communication
- There positive impacts of using technology, such as:
  - Less expensive to stay connected (comparted to telephone, post etc.)
  - Easier to make new friends
  - Easier to find people with similar interests
- There are also negatives of using technology, such as:
  - Social isolation
  - Increased anxiety from a lack of interaction
  - The way people behave online compared to offline

# **Monitoring & Controlling Transport**

- Microprocessors are used to monitor and control transport systems such as:
  - Traffic management (smart motorways etc.)
  - ANPR
  - Air traffic control in airports
  - Railway signalling

# Advantages and disadvantages of monitoring and controlling transport

Advantages
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<ul> <li>Less human error, reducing number of</li></ul>	<ul> <li>If the system fails, whole</li></ul>
accidents	transport system is stopped
<ul> <li>Efficient scheduling means more</li></ul>	<ul> <li>Open to be attacked by</li></ul>
trains/aeroplanes can run	cybercriminals
<ul> <li>ANPR can automatically penalise offences/check for insurance and cars reported stolen</li> </ul>	<ul> <li>ANPR is collecting data (privacy concerns)</li> <li>Design flaws can lead to safety</li> </ul>
<ul> <li>Smart motorways can real-time adapt to traffic and reduce journey times/delays</li> </ul>	concerns



### Autonomous vehicles

• Autonomous vehicles make use of sensors, cameras, actuators and microprocessors to get a vehicle from point A to point B without human intervention

Advantages	Disadvantages
<ul> <li>Better for environment due to efficiency</li> </ul>	Expensive
<ul> <li>Safer, no human error</li> <li>Reduced traffic congestion due to more efficient speed, braking and lane capacity</li> </ul>	<ul> <li>Security concerns, software</li> </ul>
	<ul> <li>Higher maintenance</li> </ul>
	<ul> <li>Could lead to unemployment</li> </ul>
	<ul> <li>User reluctance to new</li> </ul>
	technology

Autonomous vehicles rely on complex algorithms to work alongside the hardware

# **(**)

#### **Worked Example**

Microprocessor-controlled devices in the home have had positive effects on people's lifestyles. One of the positive effects of using these devices is that we can now set a cooker to switch on whilst we are out so that we arrive home to a cooked meal.

Describe the positive effects of using other microprocessor-controlled devices in the home.

[4]

#### Answer

Four of:



Microprocessor-controlled devices reduce the need for people to do manual tasks at home []]

People can use microprocessor-controlled devices for physical fitness tracking in the home [1]

People have more time to spend on leisure activities/shopping/socialising []] Increased sense of security as homes are protected with burglar alarms/ smoke alarms/fire alarms []]

Smart fridges can be used to improve healthy lifestyle//Smart fridges automatically order fresh food//Smart fridges reduce food waste []]

Microprocessor-controlled devices can be set remotely using a smartphone []] Saves fuel as the heating/air conditioning is not on all day []]

Reduces injuries by using microprocessor-controlled lights outside [1]





## **Health Issues**

# Health Issues

## What are health issues?

- Health issues are a common side affect of the prolonged use of IT at home or in the workplace
- There are **strategies** that should be in place **to help prevent** health issues such as:
  - Repetitive strain injury (RSI)
  - Back/neck problems
  - Eye strain
  - Headaches

### Repetitive strain injury (RSI)

- Repetitive strain injury is damage to the fingers, wrists and joints, traditionally cause d by prolonged use of a keyboard and mouse
- The effects of RSI include:
  - Pain
  - Numbness
  - Weakness
  - Stiffness
- To eliminate or reduce the risk of RSI, a user should:
  - Have the correct posture (angle of arms to the keyboard and mouse)
  - Use a wrist support if necessary
  - Take regular breaks
  - Make use of ergonomic keyboards

### Back/neck problems

- Back and neck problems are caused from sitting in front of a computer screen for prolonged periods of time
- The effects of back/neck problems include:
  - Pain
  - Stiffness
  - Muscle spasms
  - Weakness





- Numbness or tingling
- Sciatica
- Difficulty sleeping
- To eliminate or reduce the risk of back/neck problems, a user should:
  - Use adjustable chairs
  - Take regular breaks
  - Use a foot rest

#### **Eye strain**

- Eye strain is caused by staring at a computer screen for prolonged periods of time or incorrect lighting causing reflections
- The effects of eye strain include:
  - Headaches
  - Vision problems (blurred, double, light sensitivity)
  - Discomfort
- To eliminate or reduce the risk of eye strain, a user should:
  - Take regular breaks
  - Use anti-glare screen filter
  - Change from CRT to LCD monitor

### Headaches

- Headaches are caused by **a combination of factors**, including:
  - Poor lighting
  - Flickering screens
  - Reflections
  - Fatigue
- To eliminate or reduce the risk of eye strain, a user should:
  - Take regular breaks
  - Have regular eye tests
  - Use an anti-glare screen filter



