CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Subsidiary and Advanced Level

MARK SCHEME for the October/November 2015 series

9691 COMPUTING

9691/11 Paper 1 (Written Paper), maximum raw mark 75

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1 (a) **1 mark** for device + correct reason.

Input devices

barcode reader/scanner	–	to read the barcode on the product
keyboard / keypad	–	to key in barcode if scanner fails
	–	key in PIN from customer credit card
	–	key in number of items
touchscreen	–	select items of fresh fruit, etc.
weighing device	–	to weigh loose items
magnetic stripe / chip reader	–	to read magnetic stripe / chip on credit card

Output devices

screen / monitor	–	to show item description / price/total bill
printer	–	to produce itemised bill/coupons
beeper / loudspeaker	–	to indicate barcode read OK
	–	to indicate barcode failed to read OK [4]

(b) **Four** from:

- data is sent to the printer buffer
- once buffer is full, printer empties the buffer …
- … meanwhile processor gets on with other jobs
- when (printer) buffer is empty …
- … printer sends interrupt to processor
- requesting more data
- interrupt processed according to its priority [4]

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2 (i) **Three** from:

- software which erases contents of whole disk
- to setup / configure the disk for first use
- tracks and sectors checked to ensure correct format/identifies bad sectors
- identifies FAT (file allocation table) / NTFS (new technology file system)
- used to prepare a new disk for use
- disk surface divided into tracks and sectors (both) [3]

(ii) **Three** from:

- to allow the printer to communicate with the computer
- software supplied with printer hardware
- many often recognised by operating system automatically
- allows communication between hardware and operating system
- converts commands into instructions that can be carried out [3]

(iii) **Three** from:

- software that continuously checks for viruses …
- … and is running in the background
- indicates when / if a virus is found
- can remove / quarantine the virus
- checks disks and downloads for viruses automatically / asks user if they want virus scan
- to protect the computer from viruses / to detect viruses [3]

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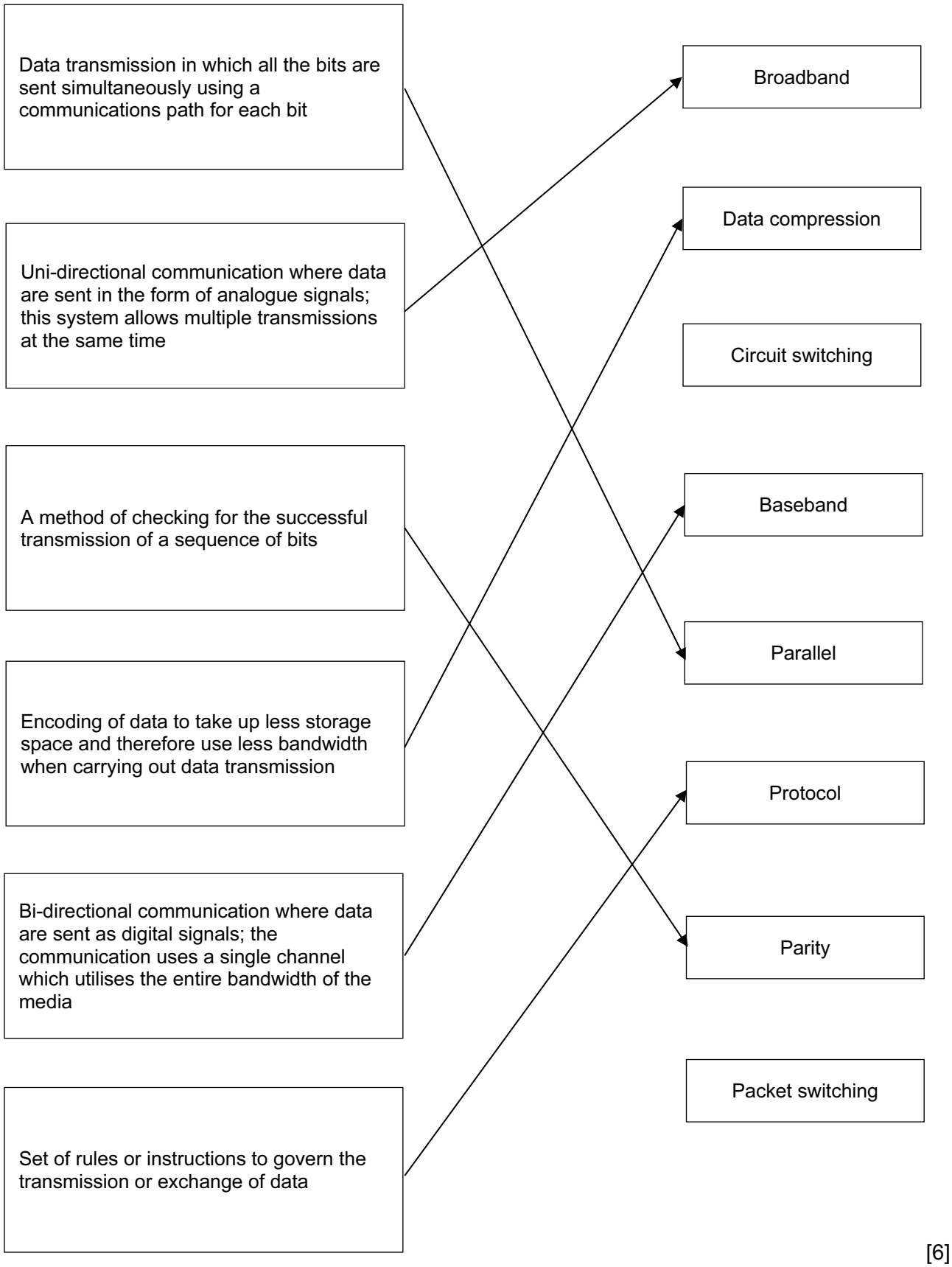
3 1 mark for each correct line entered



[6]

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4 (a) 1 mark for each correct tick (✓).

If more than two ticks then take away 1 mark for each incorrect tick.

Sensor	Suitable (✓)
motion	
oxygen	✓
acidity (pH)	✓
pressure	
humidity	

[2]

(b) (i) Two from:

- greater security than "public" line / less likely to be "tapped into" / hacked than a public line
- faster data transmission
- doesn't share data with other users
- lower level of latency (less time between initiating a request and receiving an answer)
- always available
- no rental costs from public companies [2]

(ii) Serial

- data sent one bit at a time
- down a single channel / line (NOT cable)

Full-duplex

- data sent in both directions
- at the same time / simultaneously [4]

(iii) Four from:

- data from sensors sent to processor
- ADC reference if it is clear sensor is analogue
- data stored on computer / in a database / in a spreadsheet
- data are compared against predefined acceptable values
- if values are not within the limits a warning is generated
- visually on monitor / audio signals
- graphs can be automatically produced from sensor data [4]

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5 (a) Bus

Benefits
– requires less cabling (than other two)
– cheapest (of the three) to set up
– easier to expand the network
– one node fails the rest still operate

Drawbacks
– if there is a fault in central cable, whole network goes down
– number of nodes/stations is limited
– doesn't work well under heavy load
– less secure (than others)
– difficult to isolate a fault / troubleshoot

Star

Benefits
– each node/station has its own cable
– failure on one connection doesn't affect others
– different communication methods possible for different branches
– easier to identify faults / troubleshoot
– easier to expand the network
– network is more secure

Drawbacks
– if the central hub fails, whole network goes down
– more expensive (than others) to set up
– number of nodes/stations that can be added depends on capacity of hub

Ring

Benefits
– traffic is uni-directional so has fast data transmission
– works better than bus under heavy loading
– possible to form very large networks
– no need for a central server
– less costly to set up than a star network

Drawbacks
– faulty connection / failed node can shut down whole network
– more difficult to expand the network
– less secure (than star)
– difficult to find faults/troubleshoot [6]

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(b) **Four** from (need some correct description as well as just hardware name)

If name only given, then a maximum of two marks.

- hub
  - forwards data/packets to all the devices connected to it

- bridge
  - device/software used to connect two or more segments so they can communicate

- switch
  - reads the IP/MAC address of all the devices connected to it; the switch reads the destination address of the data/packet and sends the data to the destination device only

- network (cat 5) cabling // cable terminators
  - high quality cabling is essential for high speed data transfer // bus network requires two cable terminators

- network interface card (NIC)
  - a circuit board inserted into each node (PC/workstation or server) to allow communication with other nodes

- gateway
  - a network point that acts as an entrance to another network (using a different protocol)

- router
  - operates at the network layer (layer 3) //
    routing data between nodes //
    if the router receives a packet which doesn't have a known destination address, it forwards the packet to the default gateway

- server
  - there are many dedicated servers, such as a file server, which have different tasks within the network environment

Accept other sensible hardware items [4]

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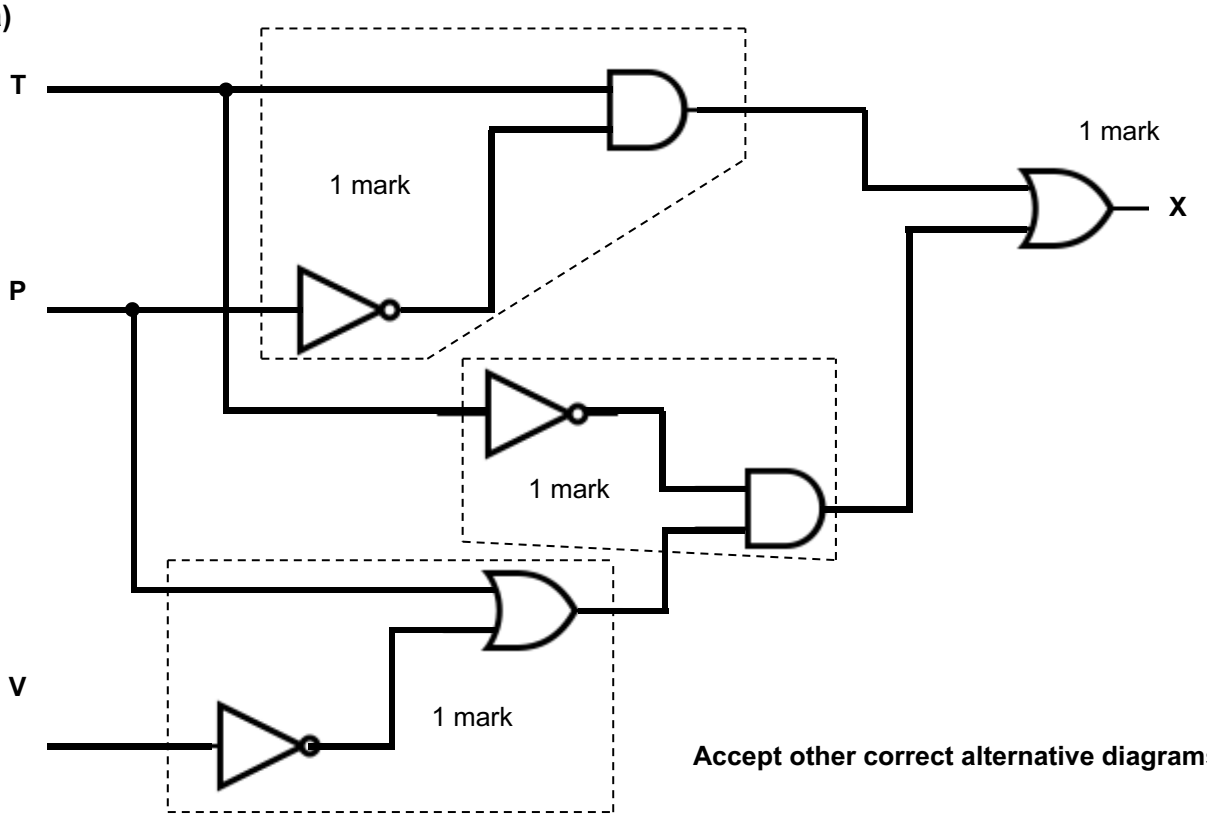
6 (a)



Accept other correct alternative diagrams

[4]

(b)

Input			Working space	Output
T	P	V		X
0	0	0		1
0	0	1		0
0	1	0		1
0	1	1		1
1	0	0		1
1	0	1		1
1	1	0		0
1	1	1		0

[4]

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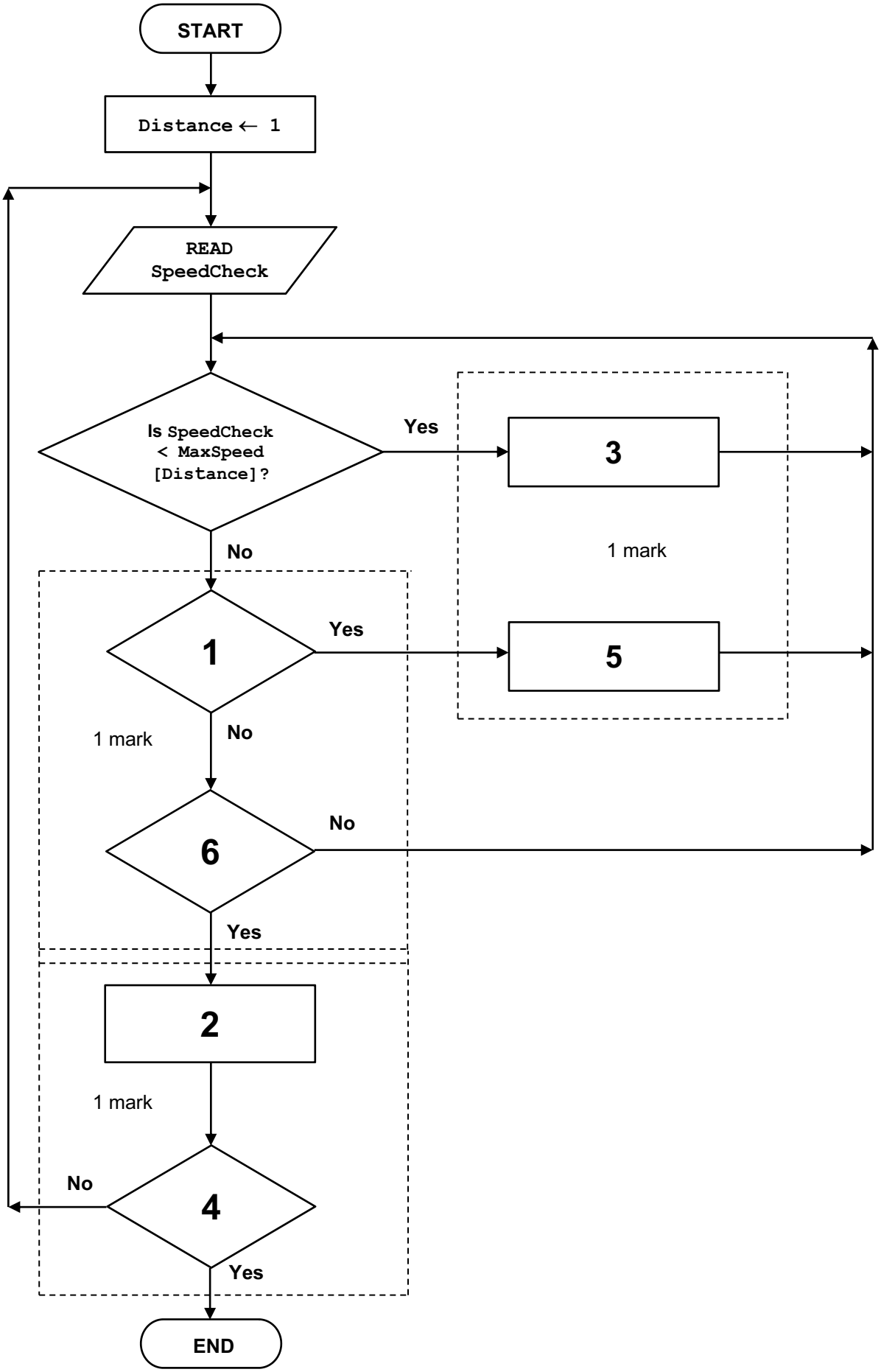
7 (a)



[3]

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(b) **Three** from (need name + description which fits scenario) for 1 mark

- writing the program code
  - implement the flowchart design as a working program
- testing
  - check to make sure the program works correctly / ensure there are no errors
- documentation
  - creating a user manual for the control room staff / technical documentation for the programmers/operations staff
- implementation / installation
  - installing the new software in the train system
- evaluation
  - checking the new software system meets all of the requirements [3]

(c) **1 mark** for type **+ 1 mark** for situation

- corrective
  - errors have been found in the software which need to be corrected / not found during testing
- perfective
  - the overall performance of the system needs to be improved [4]

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(d) (i) **A:** 158

B: 85 [2]

(ii)

1	**0**	**1**	**1**	**0**	**1**	**0**	**0**

[1]

8 (a) (i) Navigation buttons // move to a different screen // move backwards and forwards [1]

(ii) **One** from:

– use of colour green/red to show valve is open/closed
– show this visually at position 6 in diagram

Accept sensible alternatives [2]

(iii) Slider, which is labelled 0 and 20, arrow pointer indicates current value
Accept sensible alternatives [2]

(b) **Two** from:

– usually have limited desk space in a control room
– need for a mouse pad to ensure its correct operation
– known health risks from long term use of a mouse
– mouse tends to pick up dirt/dust/chemicals which hinders its operation
– difficult to operate if wearing protective gloves/clothing [2]

(c) **Two** from:

– computers respond faster than humans to a dangerous situation
– computers can monitor many plant parameters at the same time
– computers don't lose concentration / get tired / operate 24–7
– reduce human error factor
– it is easier for a human to "miss something"
– idea of keeping humans away from dangerous situations [2]

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