

বাংলাদেশ ইউনিভার্সিটি অব প্রফেশনালস্

সেকশন/গ্রুপ Section-A



ইনভিজিলেটরের স্বাক্ষর

মোট পৃষ্ঠা সংখ্যা 11 টি

BSc. in CSE-17 Final Exam (Spring) Feb-21 পরীক্ষা (Examination), 20 21

বিষয় (Subj): Computer Interfacing পত্র/কোর্স নং (Paper/Course No): CSE-405

পত্র/কোর্সের নাম (Paper/Course Name): CSE-17 কেন্দ্র (Center): MIST

রেজিঃ নম্বর (Regn No): 131401170018 শিক্ষাবর্ষ (Session): 2019-2020

রোল নম্বর (Roll No): 201714018 তারিখ (Date): 14-02-2021

INSTRUCTIONS FOR EXAMINEE

- Examinees are forbidden to write their names either on outer cover page or anywhere of the answer scripts. In case of violation, the answer script will not be evaluated.
- Examinees must mention their roll and registration number along with session on the outer cover page of the answer scripts clearly. Otherwise, answer scripts may not be evaluated.
- Students will write his examination roll number on the top left corner and section-A/B on the top right corner of each page. All pages must be numbered chronologically at the bottom center in x of y format. (for example: 1 of 21)
- In no case, an examinee will be allowed to start the examination half an hour after the commencement of examination.
- The Camera of the examinee MUST always be ON during the examination and answer script submission. If Camera is OFF then that online examination will be treated as CANCELLED.
- The focus of the camera should be such that the invigilator(s) can see the script and examinee with his/her surroundings.
- Students are to share their entire screen of desktop/laptop to the invigilator throughout the online examination.
- Browsing any files other than the given question paper (PDF) and/or online sites other than the respective allowed examination platform (e.g Zoom, Google classroom etc.) is strictly prohibited.
- Online invigilators reserve the right to take remote access of the examinee's desktop/laptop and investigate as needed at any point during the examination or even after the examination
- Students without laptop/desktop cannot appear exam online by using mobile phone. Students not possessing laptop/desktop, will have to appear examination Physically at MIST.

পরীক্ষক কর্তৃক প্রণীত

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পরীক্ষকের স্বাক্ষর

নিরীক্ষকের স্বাক্ষর

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INSTRUCTIONS FOR EXAMINEE

11. Examinees must abide by the instructions of chief invigilator if there are no definite instructions on any subject/matter.
12. No examinee will be allowed to leave the examination session until an hour has elapsed from the commencement of examination.
13. Legal action will be taken against the examinees those are trying to adopt/adopting unfair means/exhibiting unbecoming conduct in the examination hall and found guilty for any breach of discipline as per rule.
14. Invigilators will have complete authority of deducting marks from any student attempting unfair means.
15. All rough works should be done in the same paper used as answer scripts. Answer scripts should be submitted intact. Papers used for rough work should be pen through by the examinees and submitted along with the answer script.
16. The answer scripts submitted beyond specified time will be treated as CANCELLED.
17. The examinee will send his/her scanned examination script in PDF format to the following e-mail addresses:
 - (a) e-mail address of subject invigilator/examiner.
 - (b) Central Database Scheme (coursecode@mist.ac.bd)
Example: EECE433@mist.ac.bd
18. The examinee has to preserve the original answer script of every examination and be ready to submit whenever asked for.
19. Answer script should be the A4 size papers with a cover page provided by Department. Examinee has to fill up his/her necessary details on the cover page. Section A and section B must be clearly marked on the cover page like. **Section A** or **Section B**
20. Examination duration for each subject will be two hours (section-A for one hour + section B for One hour). In between students will get 15 minutes time to submit the answer script of section A and 5 minutes time to issue the question for section B . After completion of 01 hour examination time for section B, students will get 15 minutes to submit the answer script of section B.
21. After completion of written examination (online/physical), viva will be conducted by the respective faculty of that subject.

Section-AAns. to the ques. no.-01(a)

Methods of parallel data transfers are described below:

(i) Simple I/O:

Simple I/O is the most simplest form of parallel data transfers. It simply consists of a switch and a device. The switch can also be a microprocessor output port. In simple I/O it is considered that receivers will receive the data no matter what. No receiver's ack or sender's strobe signal is used.

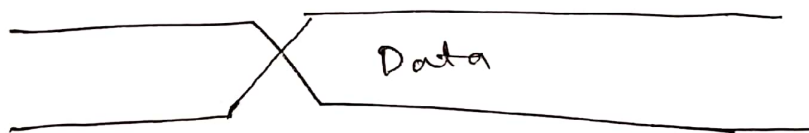


Fig: timing waveform of Simple I/O.

(ii) Strobe I/O:

In many applications, valid data is present on an external device or output port only at a certain time, so it must be read in at that specific time.

So, that a strobe signal is used by the sender to tell the receiver that valid data is present on the data bus. Strobe \overline{STB} is additionally used.
Example: Keyboard

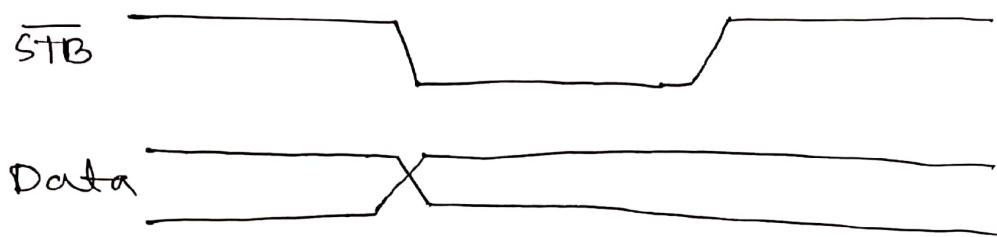


fig: timing waveform of strobe I/O.

(iii) Single handshake I/O:

In this case, first a strobe \overline{STB} signal is sent to tell the receiver if it is ready to receive. If the receiver sends back an ~~ack~~ ACK, acknowledge signal that it is ready to receive, then the data is sent.

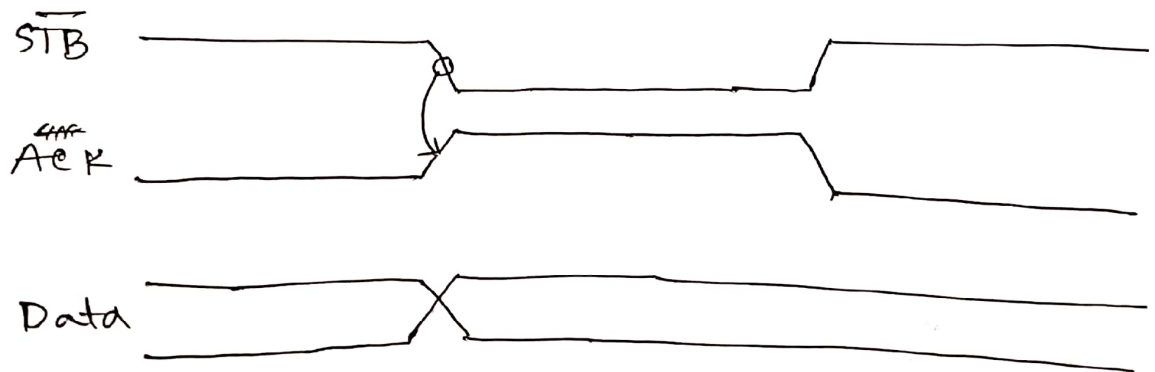


fig: timing waveform of single handshake I/O

(iv) Double handshake I/O

In this case, ~~data~~ sending device asserts \overline{STB} signal to ask the receiving device whether it is ready for data. The receiving system raises ACK signal to indicate that it is ready. The device then sends data and raises STB high to tell that valid data is present on data bus. When receiver successfully receives the data it lows the ACK signal to indicate that it has ~~su~~ received the data and sender can send the next byte of data.

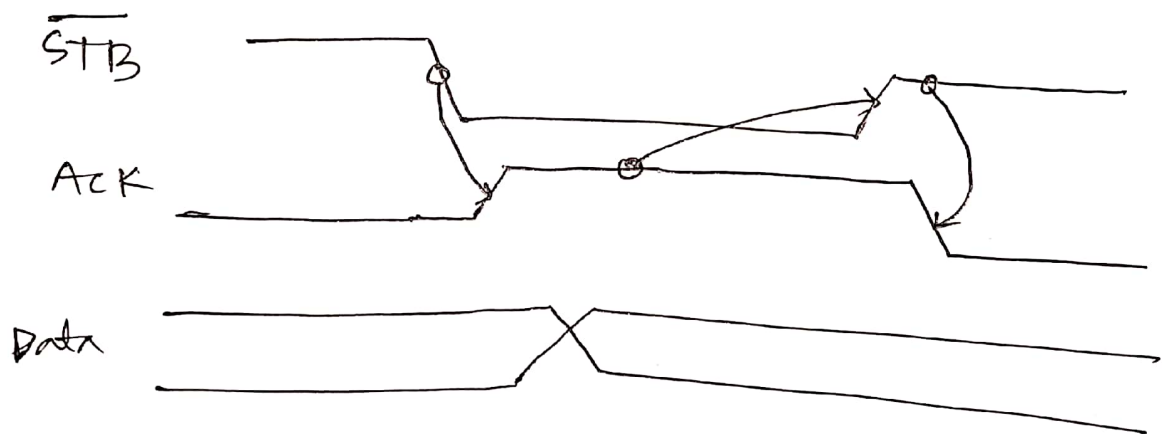


fig: timing waveform of double handshake I/O

Ans. to the ques. no.-01(b)

(i) Resistance Temperature Detector Sensor:

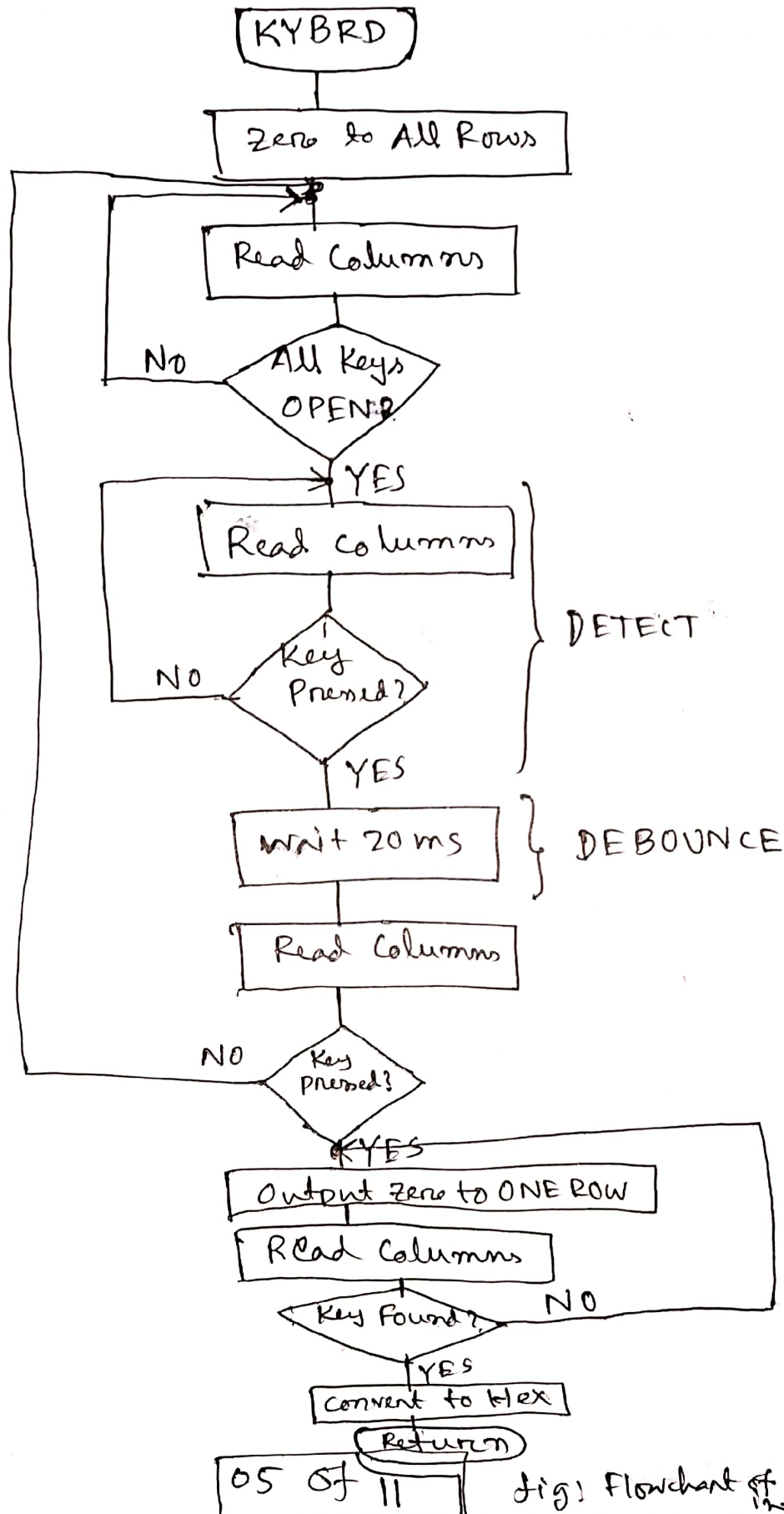
It is an temperature sensor. It is actually a resistor which changes value with respect to change in the temperature. It has stability and repeatability and can be excellent to use in range of -250 to $+850^{\circ}\text{C}$.

(ii) Linear Variable Differential Transformer:

Also known as LVDT. It is used for measuring force, pressure and position. It is consisted of 1 primary and 2 secondary wire wounds on coils and a movable iron core armature.

Ans. to the ques. no.-01(c)

Flowchart for keyboard circuit interfacing:

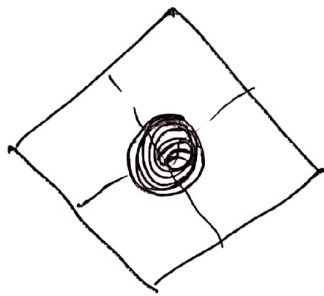


Ans. to the ques. no. - 01 (d)

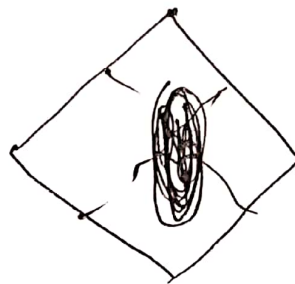
Two aspects of optical positioning are given below:

(i) Focus control:

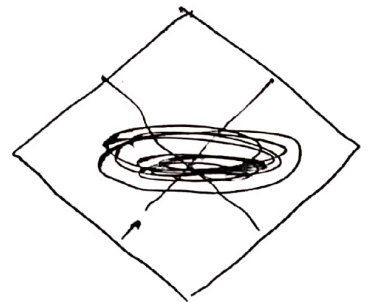
Focusing of the laser beam on the surface depends on the distance between objective lens and the surface. To control the focus, one sensor is arranged in a way that it is actually 4 sensors in a diamond shape. A cylindrical lens is placed between beam splitter and sensor array and output of top and bottom sensor summed up and compared with the output of left and right sensor summation.



In focus



Short focus



Long focus

fig: Focus control with Four sensors to detect Proper focus adjustment.

(ii) Track Following:

Track needs to be followed precisely and a rotating 2 degree mirror is used to correctly track following for the beam like in the diagram:

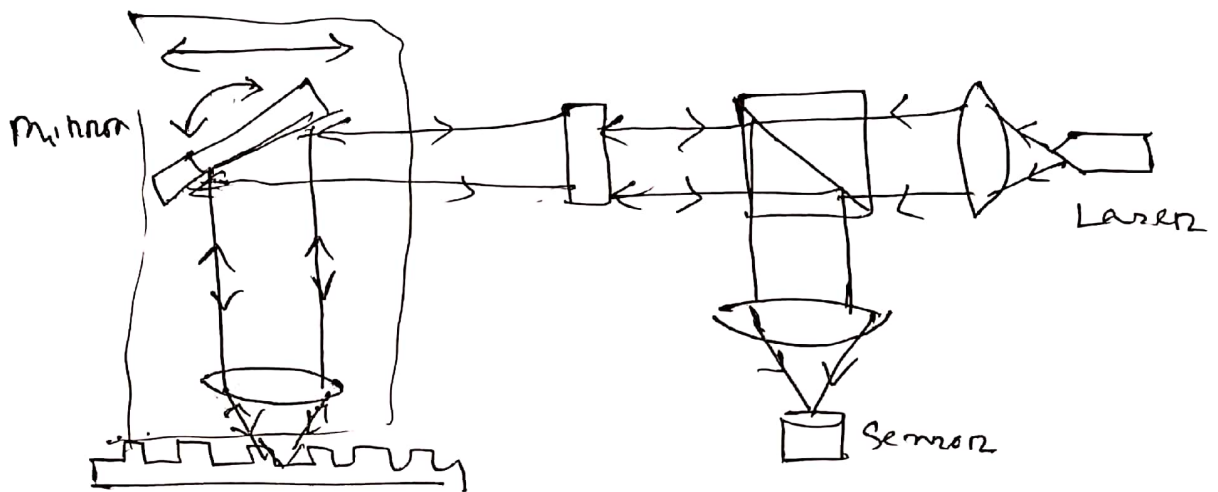


Fig: Track Following

Ans. to the ques. no.-03(a)

In the case of Magnetic Disc, if the timing circuit and surface does not match 2 situations can be created!

(i) If timing circuit runs fast and surface speed is too slow

Then, cells may be sampled twice.
So, error in reading (duplication).

(ii) If surface moves faster than the sampling rate

Then, cells may be missed.

So, error in reading (missing data).

This problem can be solved if we take timing from not just the internal electrical circuitry but from the surface itself. and calculating sampling rate by resynchronizing the clock. So, data will be read correctly.

Ans. to the ques. no. - 03(b)

(i) Ans:

\therefore Total number of cylinder = Total number of tracks in each surface = 20

(Ans.)

(ii) Ans:

To cover 20 tracks needs = 2 min = 120 sec.

$$\text{So, } 1 \text{ track needs} = \frac{120}{20} \text{ sec}$$

$$= 6 \text{ sec}$$

So, seek time = 6 sec.

Again,

~~1 rotation needs 4200~~

4200 rpm so,

4200 Rotation takes 1 min = 60 sec.

$$\therefore 1 \text{ Rotation takes} = \frac{60}{4200} \text{ sec}$$

$$= 0.01429 \text{ sec.}$$

$$\therefore \text{Total seek time} = (8 - 3) \times \text{seek time}$$

$$= 5 \times 6 \text{ sec} = 30 \text{ sec.}$$

$$\therefore \text{Latency} = 18 \times 0.01429 = 0.25722 \text{ sec.}$$

$$\text{So, Total access time} = \text{Total seek time} + \text{Latency} + \text{Transfer time}$$

$$= 30 + 0.25722 + 0$$

$$\boxed{09 \text{ of 11}} = 30.25722 \text{ sec (Ans)}$$

(iii) Am:

head needs time 3ms of 3×10^{-3} sec to go from one surface to another.

$$\begin{aligned}\text{So head needs} &= (3-1) \times 3 \times 10^{-3} \text{ sec} \\ &= 6 \times 10^{-3} \text{ sec}\end{aligned}$$

$$\begin{aligned}\therefore \text{Total seek time} &= (6-5) \times 6 \text{ sec} \\ &= 6 \text{ sec}\end{aligned}$$

$$\begin{aligned}\therefore \text{Total Latency} &= 20 \times 0.01429 \\ &= 0.2858 \text{ sec.}\end{aligned}$$

$$\begin{aligned}\text{So, total access time} &= (6 \times 10^{-3} + 6 + 0.2858) \text{ sec} \\ &= 6.2918 \text{ sec} \\ &\quad (\text{Am})\end{aligned}$$

Ans. to the ques. no.-03(c)

Control information of a magnetic disc organization are:

index marker	sector-0 header	Data	sector-0 trailer	sector-1 header
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fig: control information of magnetic disc.

first index marker indicates the track no and then each sector has a sector header, data and Sector trailer of each sectors on the track.

Ans. to the ques. no.-03(d)

We can overcome the limitation of parity bit error checking in context of optional recording by using;

① Hamming code

② Using multiple bits of parity to error check and error detection in the parity bit error so that parity error problem solves.