



GCE AS/A Level

2500U20-1 – **NEW AS**



S16-2500U20-1

COMPUTER SCIENCE – Unit 2
Practical Programming to Solve Problems

P.M. TUESDAY, 14 June 2016

2 hours

INSTRUCTIONS TO CANDIDATES

Answer **ALL** questions.

The question paper is divided into two main sections. Below are the recommended timings for this assessment.

Section A

You are advised to spend no more than **60 minutes** on this section.

You will be required to analyse and deconstruct the scenario to consider its component parts in terms that can be addressed through automated computation.

Section B

You are advised to spend no more than **60 minutes** on this section.

You will be required to develop programs that solve computing problems referring to the initial scenario.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

The total number of marks available is 60.

Assessment will take into account the quality of written communication used in your answers.

You will need a computer with an installed functional copy of the Integrated Development Environment (IDE) appropriate to your chosen programming language and word processing software.

A calculator is allowed in this examination.

Remember to save your work regularly.

Scenario



Happy Hols is a new travel agency based in Llandrindod Wells. The travel agency offers a variety of different holiday types to its customers.

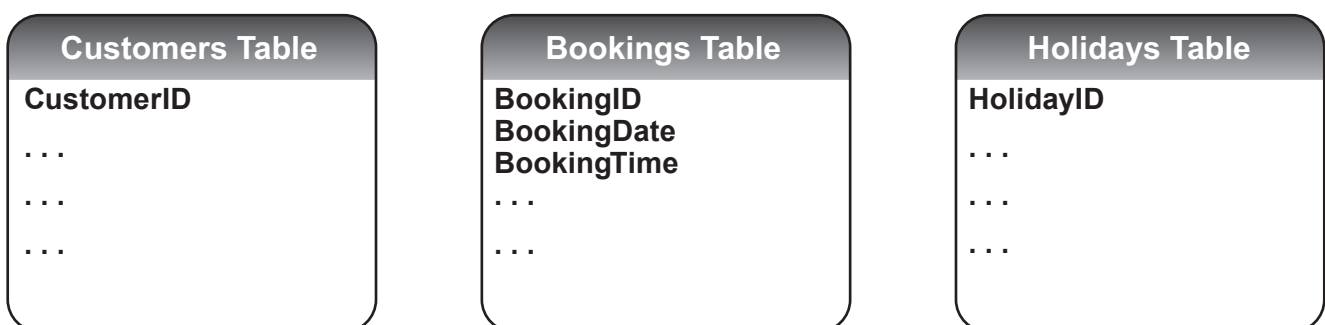
Happy Hols wishes to offer its customers the facility of being able to book their holidays using a computerised booking system. When a customer wishes to book a holiday, they can access holiday details via an interactive kiosk at the agency or by speaking to a member of staff who will access holiday details for the customer.

This new system will store details of customers along with details of the different holiday types that are available, such as all-inclusive, luxury, family, beach, ski and cruise holidays.

The main requirements of the new computer system for **Happy Hols** are:

- The ability to store and search customer details
- The ability to store holiday details and search for holidays using various preferences, e.g. search for all “ski” holidays or all “5 star” rated holidays
- The ability to store bookings for each customer

Happy Hols has provided the following partially completed entity-relationship diagram as an overview of the system they would like to create:



Section A: Analysis and Design (44 marks)

You have been asked to analyse the scenario as a preliminary step towards creating a computer system for *Happy Hols*.

Answer all questions. Present your answers as a single word-processed document named *Section A - Analysis and Design*.

1. Draw two data structure tables that will allow *Happy Hols* to store customer and holiday details. [10]
2. Copy and **complete** the entity relationship diagram provided in the scenario. [6]
3. Construct a flowchart for the process of searching for a specific holiday, e.g. a Cruise. [6]
4. Select and fully justify your proposed method of solution for the three main requirements listed in the scenario. [6]
5. Different modes of operation are used for processing data in different operating systems.
Happy Hols will have to consider different modes of operation that will affect their holiday booking system. Suggest **one** suitable and **one** unsuitable mode of operation for this system and justify your answers. [8]

6. **Happy Hols** stores the details of its holidays in an array, which is sorted in order of price (lowest to highest). [8]

HolidayArray[]:

		0	1	2	3	4	5	6	7	...
Holiday ID	0	438	143	221	455	623	549	987	129	...
Price £	1	240	255	275	285	295	310	325	350	...

Using a recognised convention, design an algorithm that performs a search for all the HolidayIDs that are available between two entered price ranges.

The algorithm should output the HolidayID and price for all the matches between the two prices entered. If there are no Holidays available within the price range entered the algorithm should output: "No Match Found".

For example:

If the user entered a price range of:

Lowest=250

Highest=290

then the algorithm would output:

HolidayID: 143

Price £: 255

HolidayID: 221

Price £: 275

HolidayID: 455

Price £: 285

Save your work as Section A - Analysis and Design.

Section B: Develop programs (16 marks)

Select the programming language of your choice from section BI, BII or BIII and answer all 3 questions within your chosen section.

BI Visual Basic

Happy Hols wants the computer system to be developed using Visual Basic.

1. Open the file Holidays.sln
 - Read through the code and familiarise yourself with its contents.
 - The file contains incomplete code, which is intended to save holiday details and return the number of holidays that match the search criteria entered.

Complete this code.

Remember to save the changes made to the file Holidays.sln [4]

2. Create a new form, with a suitable interface, that will allow *Happy Hols* to:
 - Input customer details
 - Validate customer details
 - Store customer details on disc in a text file called customerdetails.txt
 - Retrieve specified customer details from disc

Save your new form as Customers.frm [8]

3. Using the internal facility of your chosen language, annotate your code from question BI (2) to clearly explain the design of your program to another software developer.

Remember to save the changes made to the file Customers.frm [4]

BII Java

Happy Hols wants the computer system to be developed using Java.

1. Open the file Holiday.java
 - Read through the code and familiarise yourself with its contents.
 - The file contains incomplete code, which is intended to save holiday details and return the number of holidays that match the search criteria entered.

Complete this code.

Remember to save the changes made to the file Holiday.java

[4]

2. Create a new form, with a suitable interface, that will allow **Happy Hols** to:
 - Input customer details
 - Validate customer details
 - Store customer details on disc in a text file called customerdetails.txt
 - Retrieve specified customer details from disc

Save your new form as Customers.java

[8]

3. Using the internal facility of your chosen language, annotate your code from question BII (2) to clearly explain the design of your program to another software developer.

Remember to save the changes made to the file Customers.java

[4]

Bill Python

Happy Hols wants the computer system to be developed using Python.

1. Open the file `Holidays.py`
 - Read through the code and familiarise yourself with its contents.
 - The file contains incomplete code, which is intended to save holiday details and return the number of holidays that match the search criteria entered.

Complete this code.

Remember to save the changes made to the file `Holidays.py` [4]

2. Create a new form, with a suitable interface, that will allow **Happy Hols** to:
 - Input customer details
 - Validate customer details
 - Store customer details on disc in a text file called `customerdetails.txt`
 - Retrieve specified customer details from disc

Save your new form as `Customers.py` [8]

3. Using the internal facility of your chosen language, annotate your code from question Bill (2) to clearly explain the design of your program to another software developer.

Remember to save the changes made to the file `Customers.py` [4]

END OF PAPER